File

M I N U T E S

of the

MEETING OF THE S-9 TECHNICAL COMMITTEE

"NEW PLANTS"

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

North Carolina State
of the
University of North Carolina

Raleigh, North Carolina
July 22-23, 1964

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MINUTES OF THE TECHNICAL COMMITTEE
SOUTHERN REGIONAL PROJECTS S-9 "NEW PLANTS"
North Carolina State
Raleigh, North Carolina

W.T. Fike, Chairman; Eli L. Whiteley, Secretary

1. Registration

The meeting of the S-9 Technical Committee was called to order by Chairman W.T. Fike at 8:00 a.m. July 22, 1964.

2. Roll call of S-9 Members

Administrative advisor	R.L. Lovvorn	
Regional Coordinator	W.R. Langford	
Alabama	C.S. Hoveland	
Arkansas	A.M. Davis	Absent
Florida	G.B. Killinger	
Georgia	A.H. Dempsey	
Kentucky	W.H. Stroube	
Louisiana	J.C. Miller	
Mississippi	H.W. Bennett	
North Carolina	W.T. Fike, Chairman	
Oklahoma	R.S. Matlock	
Puerto Rico	Hassan Azzam	
South Carolina	J.A. Martin	
Tennessee	W.E. Roever	
Texas	E.L. Whiteley, Secretary	
Virginia	J.T. Smith	

Cooperative State Research Service, Washington, D.C.
D.Y. Perkins

New Crops Research Service, Beltsville, Maryland
A.J. Oakes

Soil Conservation Service, Athens, Georgia
W.C. Young

Northern Util. Res. & Development Div., Pecria, Illinois
I.A. Wolff

Chemurgic Crop Investigations, NCRB, Beltsville, Maryland
J.R. Haun Absent

Visitors

Dr. Cochran, Head Horticulture Department, North Carolina State

Grover Sowell, Regional Plant Introduction Station, Experiment, Ga.

3. Welcome

Dr. Cochran, Head Horticulture Department of North Carolina State welcomed the committee to Raleigh.

4. Minutes and Agenda

The 1963 minutes and the proposed agenda for the 1964 meeting were approved as modified.

Wednesday, July 22, 1964 Agenda

1. Registration - Mc Kimmon Room, Williams Hall
2. Roll call of S-9 members
3. Welcome - Dr. Cochran, Head Department of Horticulture
4. Presentation of Agenda and its acceptance, with additions or deletions by delegates.
5. Appointment of committees
6. State and Federal Agency Reports

Alabama	South Carolina
Arkansas	Tennessee
Florida	Texas
Georgia	Virginia
Kentucky	Regional Plant Introduction Station
Louisiana	Cooperative State Research Service
Mississippi	New Crops Research Branch
North Carolina	Soil Conservation Service
Oklahoma	Crop Development Section NCRB
Puerto Rico	Northern Utilization Research and Development Division

6:30 p.m.
A buffet supper was held in the McKimmon Room.

7:30 p.m.
Dr. A.J. Oakes presented an illustrated talk on his recent plant exploration in South Africa.

8:30 p.m.
Business meeting resumed.

Thursday, July 23, 1964 Agenda

7:00 a.m.
A field trip was made by bus to the Upper Coastal Plain Research Station, Rocky Mount, N.C.

1:30 - 4:30 p.m.
Business meeting was held.

7. Status of contributing projects to S-9.

8. Status of the survey of Clonal Stocks.

9. Development of Chart of Responsibility for 1965.

10. Requests for specific plant introductions through plant explorations.

11. Continued collection of Domestic Fruit.

12. *Cassia occidentalis* - Seed gum crop - yes or no.

13. Next meeting: Where? When?

14. Election of Executive Committee: A. Chairman; B. Secretary

15. Adjourn

5. Chairman W. T. Fike appointed the following committees

Nominations	Time and Place	Resolutions
R.S.Matlock, Chairman	A.H.Dempsey, Chairman	W.H.Stroube, Chairman
C.S.Hoveland	J.A.Martin	J.C.Miller
H.W.Bennett	G.B.Killinger	Hassan Azzam

6. State and Federal Agency Reports

Reports by committee members were given in the following order and are summarized in Appendix A.

Alabama	C.S.Hoveland
Arkansas	W.T.Fike (for A.M.Davis)
Florida	G.B.Killinger
Georgia	A.H.Dempsey
Kentucky	W.H.Stroube
Louisiana	J.C.Miller
Mississippi	H.W.Bennett
Oklahoma	R.S.Matlock
Puerto Rico	Hassan Azzam
South Carolina	J.A.Martin
Tennessee	W.E.Roever
Texas	E.L.Whiteley
Virginia	T.J.Smith
Regional Plant Introduction Station	W.R.Langford and G. Sowell
Cooperative State Research Service	D.Y.Perkins
Northern Utilization Research and Development Division	I.A.Wolff
New Crops Research Branch	A.J.Oakes
Soil Conservation Service	W.C.Young
North Carolina	W.T.Fike

7. Dr. R.L.Lovvorn, Administrative Advisor, described the Coastal Plains area to be visited by the committee on July 23.

8. Visit to the Upper Coastal Plain Research Station, Rocky Mount, N.C.

The committee assembled at 7:00 a.m. on July 23 and departed for the station at Rocky Mount. Upon arrival at the station the group was welcomed by Superintendent Cox and were conducted on a tour of the station. The committee inspected the new crops plantings on the station and discussed some of the problems involved in the production of new crops.

Business Meeting

The business meeting was called to order by Chairman W.T. Fike at 1:35 p.m. and the following subjects were discussed:

9. Status of contributing projects to S-9

Dr. Lovvorn discussed the need for contributing projects. Five states do not have contributing projects. These states were encouraged to submit contributing projects.

Dr. Lovvorn stated that there was no change in pooled funds that support the Regional Station. He further stated that the other three regions were following the same type of program as the Southern Directors in allocating funds to the regional stations.

10. Status of Survey of Clonal Stocks

Dr. Oakes discussed the status of the survey and indicated the need for evaluation of the surveys already made. A committee will be appointed by the Chairman of the National Coordinating Committee to study the survey and recommend what needs to be done in this area.

11. Development of Chart of Responsibilities

Chairman W.T. Fike stated that the work on a specific crop is the responsibility of the region as a whole. Where work needs to be done, each state should contribute to the work on each crop that shows promise of being adapted to the south and has the potential of being accepted by industry.

The Chart of Responsibilities for S-9 will be found in Appendix B of these minutes.

12. Requests for specific plant introductions through plant explorations

One plant exploration to collect grasses and legumes in southern Europe is being planned. Requests for plant materials to be collected in this area should be forwarded to the Regional Coordinator at an early date.

13. Continued Collection of Domestic Fruit Stocks

Dr. Miller discussed the work being carried out in Louisiana with the clonal stocks assembled there. He stated that 48 fruits including peaches, apples, pears and plums are ready for distribution. Dr. Miller recommended that funds be continued for the collection of domestic clonal stocks.

Dr. Oakes discussed the need for a report on the status of the clonal stocks. He recommended that the report explain what has been done and what needs to be done in the future. The need for an index of the material already collected was indicated.

A report prepared by W.R.Langford and J.C.Miller will be included in the minutes of the S-9 meeting.

The following motion was made concerning the collection of domestic fruit stocks:

"That individuals receiving support for Domestic Fruit Collections be requested to send to the Regional Coordinator of S-9 a list of fruit collections already made and their plans for future collections. The coordinator is requested to compile this information and transmit it to Mr. Hyland with a request for additional funds for support."

The motion was made by Dempsey, seconded by Miller. Motion passed.

14. Cassia occidentalis - Seed gum Crop?

Cassia was discussed by the committee members and the conclusion was reached that more work needs to be done on the crop.

The committee recommends that more work be done on utilization. After considering the toxicity of this crop, the committee feels that it can be grown in many areas in the south. The committee therefore requests that the Northern Utilization Research and Development Laboratory under-take the research necessary to develop this crop. This work should include feeding trials with both plant material and seed.

15. Next Meeting

The committee on time and place of meeting submitted the following report. "The committee on time and place of the next S-9 meeting attempted to contact as many members as possible and determined their wishes as to the meeting place in 1965. We would like to suggest that the next S-9 meeting be held in Stillwater, Oklahoma. We also suggest that the Executive Committee and Dr. Matlock set the exact date during the last two weeks in July.

A.H. Dempsey, Chairman
J.A. Martin
G.B. Killinger "

Motion that the report be accepted was made by Dempsey and seconded by Killinger. Motion passed.

The next meeting will be at Oklahoma State University, July 21-22, 1965.

16. Election of Officers

The nomination committee submitted the following report: "The nominating committee submits the following for your consideration:

Chairman S-9 - Eli L. Whiteley
Secretary S-9 - Hassan Azzam

We further recommend that the Executive Committee be empowered to select a person or persons to attend the National Coordinating Committee Meeting in event the Chairman and/or Secretary cannot attend.

Respectfully submitted,

H.W. Bennett
C.S. Hoveland
R.S. Matlock, Chairman"

Motion that the report be accepted was made by Matlock and seconded by Bennett. Motion passed.

17. Report of Resolutions Committee

The resolutions committee submitted the following report:

"Be it resolved that the S-9 Technical Committee go on record as expressing its appreciation to North Carolina State of the University of North Carolina at Raleigh and its representatives for providing the excellent facilities and setting for conducting the 1964 annual meeting of said group.

Be it further resolved that special recognition and appreciation be directed to Drs. Fike and Lovvorn for their personal attention to the details of business, education and entertainment that made said meeting a successful and beneficial one. In addition, grateful appreciation for the delicious meals served to the group be expressed.

Respectfully submitted

J.C.Miller
Hassan Azzam
W.H.Stroube, Chairman"

Motion that the report on resolutions be accepted was made by Stroube and seconded by Miller. Motion passed.

18. Adjournment

The meeting adjourned at 4:30 p.m.

19. Meeting of Executive Committee

The Executive Committee met at 4:30 p.m., July 23, 1964 to consider projects submitted by Mississippi and Kentucky. After due consideration the committee approved the projects.

APPENDIX A

State and Federal Agency Reports

REPORT ON S-9 (PLANT INTRODUCTION)

ACTIVITIES IN ALABAMA JULY, 1963 - JULY, 1964

Carl S. Hoveland
Agronomy and Soils Department
Auburn University

A total of 532 new plant accessions were received by personnel of the state experiment station, T.V.A., and private nurseries from the Regional Station since the Annual S-9 Meeting in July, 1963. Of these introductions, 309 were ornamentals, 100 cowpeas, 68 forage grasses, 55 forage legumes and 2 fiber crops.

POTENTIAL CHEMURGIC CROPS

Eight accessions of *Crotalaria intermedia* were screened in replicated plots at Tallassee, Alabama. Good stands were obtained and all entries bloomed or started to bloom before being severely damaged by disease. Severe dieback of plants or complete loss of stand resulted. The disease organism was plated out and identified as stem blight (*Rhizoctonia solanii*). No seed was harvested. Two accessions of *Cassia occidentalis* in the same test yielded 2276 lb./acre of hand-harvested seed from P.I. 204366 and 2352 lb./acre from P.I. 204366-1.

A 1/4-acre of *Cassia occidentalis* 204366 was grown on a sandy loam soil at Tallassee, Alabama and combined in September with an Allis-Chalmers harvester. A seed yield of 1019 lb./acre was obtained by a direct combining. One-half of the area was treated with DEF cotton defoliant one week previous to harvesting. Combining of the treated area was much easier as less green material interfered in the combine cylinder. Some problems were encountered with stems winding on the reel. Production and harvesting of this crop appear to be commercially feasible if a suitable market can be developed.

HORTICULTURAL CROPS

P.I. 140471 is being utilized by Dr. J. D. Norton in his cantaloupe breeding program. F_1 hybrids have been produced, using this accession to transfer gummy stem blight resistance to cantaloupes with good market quality.

Dr. Henry Orr reports that several ornamental introductions have desirable characteristics:

Eucomis undulata P.I. 196191 - Valuable as exotic bedding-type perennial. Crown effect of leaves. Flower stalk 18 inches, blooming in July.

Osmanthus "Gulftide" P.I. 213303 - Quite upright habit, now in commercial production by South Alabama nurseries.

Ilex altaclarensis "Wilsonii" P.I. 241325 - Slow growing but excellent color.

Ilex serrata "Sieboldii" P.I. 235509 - Effective as informal border plant.

Ilex altaclarensis P.I. 243844 - Not desirable; P.I. 241325 - better.

Gardenia lucida P.I. 249466 - Relatively dwarf, heavy flowering.

FORAGE CROPS

Dr. E. D. Donnelly in his vetch breeding program made a cross between *Vicia sativa* (Ala. 1894) and *V. angustifolia* (P.I. 121275 from Turkey) to incorporate the hard seedcoat of the latter with good agronomic characteristics of Ala. 1894. The F_1 was over 90% sterile. However, fertility has been restored in advanced generation lines. These lines produce excellent yields of herbage and seed,are nematode resistant, and have reseed satisfactorily in bermudagrass and bahiagrass sods. Certain lines are being increased for testing on a larger scale.

Dr. W. C. Johnson and Mr. R. L. Shepherd screened 35 white clover accessions for resistance to root knot nematode (*Meloidogyne incognita acrita*). Tests were conducted in greenhouse beds, the plants remaining in the beds for 70 days. Two tests were conducted and each P.I. was represented by 40 plants in each test. No P.I. was found free of root galling so none were considered resistant. The following P.I.'s were included:

FC 36211	223021
166371	226102
180491	227874
181812	228163
189175	229655
189176	230183
189395	232109
193164	232942
195485	234265
197830	234489
200372	234677
201214	234793
204510	234828
204514	249872
204788	250997
209986	251862
212245	231784
220837	

Lotononis bainesii indicated good possibilities as a summer perennial legume. Spreading of stolons occurred rapidly in coastal bermuda sod. Recently, a virus disease has seriously retarded mid-summer growth although recovery is good during the fall.

Trifolium vesiculosum P.I. 233816 was increased and released in 1964 as Yuchi arrowleaf clover by the Auburn University Agric. Expt. Sta. Clipping trials at 10 locations in Alabama show that this clover reseeds well and makes high yield of fcrage in late winter and spring, maturing about 2 months later than crimson clover. Winter production of Yuchi has been superior to that of Amclo arrowleaf clover.

Flooding studies with clovers have shown that ball (P.I. 206769) and intermediate white clover were quite tolerant of poor drainage. In contrast, Yuchi arrowleaf (P.I. 233816) grew poorly with poor drainage and was similar to crimson clover in this respect.

SUGAR CROPS

Sugar beet trials are in progress this summer at the Tennessee Valley Substation in Alabama. Winter trials with this crop will be established this fall at the Gulf Coast Substation near Mobile. Prospects for this crop in Alabama are probably not bright.

Prospects for sugar from sorghum are much brighter. Tests conducted at Tallassee, Alabama over the past 3 years in cooperation with Dr. O. Coleman, Sugar Crops Station, Meridian, Mississippi have given yields of sugar per acre from 2400 to 4200 pounds.

MANUSCRIPTS CONCERNING PLANT INTRODUCTION MATERIALS

1. Hoveland, C. S. Germination and seedling vigor of clovers as affected by grass root extracts. Crop Sci. 4:211-213. 1964.

2. Hoveland, C. S. Frontier crimson clover. Auburn Univ. Agr. Expt. Sta. Highlights of Agric. Res. Vol. II, No. 3, 1964.

3. Hoveland, C. S. Yuchi arrowleaf clover. Auburn Univ. Agr. Expt. Sta. Leaflet. (In Press). 1964.

4. Hoveland, C. S. and Webster, H. L. Tolerance of Five *Trifolium* species to Flooding. Agron. Jour. (In Press). 1964.

Report of the Arkansas Agricultural Experiment Station Activities Relative to S-9

A. M. Davis

During the past year we have experienced some progress with "new plants". Introductions under evaluation, received since July 1963, have been:

65 *Lotus corniculatus*, studied for resistance to root rot.

51 *Beta vulgaris*, observed for resistance to Cercospora leaf spot and Rhizoctonic root rot.

26 Sorghum (perennial) accessions, as sources of breeding germ plasm for Helmenthosporium resistance and low prussic acid content.

2 *Cryptomeria japonica*, evaluated as a new ornamental and/or forest cedar tree.

2 *Hypericum cernuum*

2 *Hypericum oblongifolium*

2 *Hypericum patulum*

1 *Lilium nepalense*

3 *Liriope spicata*

Bulk lots of seed for field-size plantings of *Foeniculum vulgare* and *Vernonia anthelmintica* were evaluated as possible ornamentals.

The *Lotus corniculatus* was planted in September 1963 in a dust seedbed. No moisture fell until winter and germination was delayed until spring. Growth habit is from prostrate to strongly upright. Root and crown rot problems usually develop after a wet winter; therefore, evaluation will not be possible until the spring of 1965.

The sugar beet entries were planted on April 4, with germination and emergence generally poor. Cercospora is just now beginning to develop and differential evaluation will be possible by the end of August. Considerable variation in color and bolting has been experienced. P.I.'s 109038, 169025, 182146, 215577 and 223755 bolted and are now producing seed. P.I.'s 182146 and 215571 contain considerable red pigment in the foliage. No yield comparisons will be possible due to eradicness of the stand. Comparison of sugar content will be possible on non-bolting entries at harvest.

The sorghum entries (all *Sorghum halepense*) are being handled by Dr. R. L. Thurman. Of the 26 entries tested, only seven showed enough seedling qualities to continue, these being 185458, weak rhizomes; 217963 and 228364, heavy vigorous rhizomes; and 255738, 271230, 273951 and 275364, no rhizomes, bunch-type growth.

The Japanese cedars (279746 and 279748) are beginning to show new growth after almost complete defoliation following setting in the field.

Foeniculum vulgare (268383) was planted September 2, 1963 in a dry, dusty seedbed. No moisture fell until late November and germination did not take place until early spring, 1964. An estimated one-half stand emerged in late February. Early March produced some temperatures in the low "teens", and these seedlings failed to survive. At present, there are six plants alive out of 24 rows 140 feet long.

Vernonia anthelmintica was planted April 2, 1964, with a good stand obtained. This seed was held over from the planting in 1963 which was harvested by hand in October. The plants are now 16-18 inches tall and are beginning to flower, showing promise of a harvest equal to last year's record of 148 pounds cleaned seed per acre. Due to the establishment of this planting, the seed furnished April 21 by J. R. Haun was not used. To date this species has shown little disease and good response to nitrogen fertilization and irrigation. The 1964 planting has been furrow-irrigated three times to date.

Seed of Crotalaria juncea and Kenaf were planted May 6, 1964. The following day one-half inch of rain fell, stimulating good emergence from all entries. The Brazilian strain of C. juncea is blooming but setting no seed. It is about one foot shorter than the Texas 374 entry. The Kenaf is five feet tall and the C. juncea reaches six and seven feet in height. This planting is spaced with a plant every three inches in the row. The stems are remaining finger size and smaller.

Attached to this report is a supplement from the Department of Plant Pathology relative to its search for Cercospora resistance in watermelon and related species.

The resistance sought was not found among the varieties tested or the P.I.'s.

AGRICULTURAL EXPERIMENT STATION
University of Arkansas
Fayetteville, Arkansas

Plant Pathology Department

Screening for resistance to Cercospora leaf spot in watermelon. - Monroe J. Goode.

Cercospora leaf spot, caused by Cercospora citrullina Cooke, is the most destructive and commonly-occurring watermelon disease in Arkansas. Attempts have been made to find a source of resistance to this disease. Greenhouse inoculation techniques were developed and all plant introductions in the genus Citrullus that were available in January 1963 were screened. Breeding lines developed by Watts at Arkansas and 18 varieties were also screened. No resistant source has been found. The following varieties of watermelon were susceptible:

Blackstone	Honey Cream
Tendersweet	Dixie Queen WR
Wonder Improved Kleckly	Klondike Striped
Tom Watson	Harris Earliest
Stone Mountain	Klondike R-7 WR
Sugar Baby	Klondike Black Seeded
Garrisonian	Black Diamond
Irish Gray	New Hampshire Midget
Hawkesbury	Hope Diamond

The following plant introductions were susceptible:

Citrullus colocynthus

195927	Africa
220778	Afghanistan
269365	Afghanistan

C. vulgaris

161373	Ethiopia	164570	India	164992	Turkey
162667	Argentina	164633	India	164998	Turkey
163202	India	164634	India	165002	Turkey
163203	India	164636	India	165024	Turkey
163204	India	164639	India	165448	Mexico
163205	India	164655	India	165451	Mexico
163572	Guatemala	164665	India	165523	India
163574	Guatemala	164685	India	166993	Turkey
164146	India	164687	India	167026	Turkey
164247	Liberia	164708	India	167045	Turkey
164248	Liberia	164709	India	167059	Turkey
164474	India	164737	India	167124	Turkey
164475	India	164748	India	167125	Turkey
164539	India	164804	India	167126	Turkey
164550	India	164977	Turkey	167219	Turkey

Plant Introduction - continued:

Citrullus vulgaris, con't.

167222	Turkey	169281	Turkey	174099	Turkey
169232	Turkey	169282	Turkey	174100	Turkey
169233	Turkey	169283	Turkey	174101	Turkey
169234	Turkey	169284	Turkey	174103	Turkey
169235	Turkey	169285	Turkey	174104	Turkey
169236	Turkey	169286	Turkey	174105	Turkey
169237	Turkey	169287	Turkey	174106	Turkey
169238	Turkey	169288	Turkey	174107	Turkey
169240	Turkey	169289	Turkey	174108	Turkey
169241	Turkey	169290	Turkey	174109	Turkey
169242	Turkey	169291	Turkey	175102	Turkey
169243	Turkey	169292	Turkey	175650	Turkey
169244	Turkey	169293	Turkey	175651	Turkey
169245	Turkey	169294	Turkey	175652	Turkey
169246	Turkey	169295	Turkey	175653	Turkey
169247	Turkey	169296	Turkey	175654	Turkey
169248	Turkey	169297	Turkey	175655	Turkey
169249	Turkey	169299	Turkey	175657	Turkey
169250	Turkey	169300	Turkey	175658	Turkey
169251	Turkey	171392	Turkey	175659	Turkey
169252	Turkey	171579	Turkey	175660	Turkey
169253	Turkey	171580	Turkey	175661	Turkey
169254	Turkey	171582	Turkey	175662	Turkey
169255	Turkey	171583	Turkey	175663	Turkey
169256	Turkey	171584	Turkey	175664	Turkey
169257	Turkey	171585	Turkey	175665	Turkey
169258	Turkey	171586	Turkey	176485	Turkey
169259	Turkey	171587	Turkey	176486	Turkey
169260	Turkey	172787	Turkey	176488	Turkey
169261	Turkey	172788	Turkey	176489	Turkey
169262	Turkey	172789	Turkey	176490	Turkey
169263	Turkey	172790	Turkey	176491	Turkey
169264	Turkey	172791	Turkey	176492	Turkey
169265	Turkey	172792	Turkey	176493	Turkey
169266	Turkey	172793	Turkey	176494	Turkey
169267	Turkey	172795	Turkey	176495	Turkey
169268	Turkey	172796	Turkey	176496	Turkey
169269	Turkey	172797	Turkey	176497	Turkey
169270	Turkey	172798	Turkey	176499	Turkey
169271	Turkey	172799	Turkey	176905	Turkey
169272	Turkey	172800	Turkey	176906	Turkey
169273	Turkey	172801	Turkey	176907	Turkey
169274	Turkey	172802	Turkey	176908	Turkey
169275	Turkey	172804	Turkey	176909	Turkey
169276	Turkey	172805	Turkey	176910	Turkey
169278	Turkey	173668	Turkey	176911	Turkey
169279	Turkey	173670	Turkey	176912	Turkey
169280	Turkey	174098	Turkey	176913	Turkey

Plant Introduction - continued:

Citrullus vulgaris, con't.

176914	Turkey
176915	Turkey
176916	Turkey
176917	Turkey
176918	Turkey
176919	Turkey
176921	Turkey
176922	Turkey
176923	Turkey
177318	Turkey
177319	Turkey
177320	Turkey
177321	Turkey
177322	Turkey
177323	Turkey
177324	Turkey
177325	Turkey
177327	Turkey
177328	Turkey
177329	Turkey
177330	Turkey
177331	Turkey
178870	Turkey
178871	Turkey
178872	Turkey
178873	Turkey
178874	Turkey
178876	Turkey
178877	Turkey
179232	Turkey
179233	Turkey
179234	Turkey
179235	Turkey
179236	Turkey
179237	Turkey
179238	Turkey
179239	Turkey
179240	Turkey
179241	Turkey
179242	Turkey
179243	Turkey
179661	India
179662	India
179875	India
179877	India
179878	India
179879	India
179880	India
179881	India
179882	India
179883	India
179884	India
179886	India
180276	India
180277	India
180278	India
180426	India
180427	India
181740	Lebanon
181741	Turkey
181742	Turkey
181743	Turkey
181744	Turkey
181868	Syria
181935	Syria
181936	Syria
181937	Syria
182175	Turkey
182176	Turkey
182177	Turkey
182178	Turkey
182179	Turkey
182180	Turkey
182181	Turkey
182183	Turkey
182932	India
182933	India
182934	India
182935	India
183022	India
183023	India
183123	India
183124	India
183125	India
183126	India
183217	India
183218	India
183300	India
183398	India
183673	Turkey
184800	Africa
185030	Turkey
185635	Africa
185636	Africa
186489	Africa
186490	Africa
186974	Africa
186975	Africa
188808	Philippines
189225	Africa
189316	Nigeria
189317	Africa
189318	Africa
190050	Yugoslavia
192937	China
192938	China
193490	Africa
193963	Africa
193964	Africa
193965	Africa
195562	Africa
195928	Africa
200732	Guatemala
200733	Guatemala
203551	New Mexico
204689	Turkey
207471	Afghanistan
207472	Afghanistan
207473	Afghanistan
208740	Cuba
210017	India
211011	Afghanistan
211013	Afghanistan
211849	Iran
211850	Afghanistan
211851	Afghanistan
211852	Afghanistan
212094	Afghanistan
212208	Greece
212209	Greece
212287	Afghanistan
212288	Afghanistan
212289	Afghanistan
212596	Afghanistan
214044	India
214316	India
216029	India
217522	Pakistan
217937	Pakistan
217938	Pakistan
217939	Pakistan
219691	Pakistan
219906	Afghanistan
219907	Afghanistan
220779	Afghanistan
221430	Iran
222137	Africa

Plant introduction - continued:

Citrullus vulgaris, con't.

222184	Afghanistan
222710	Iran
222711	Iran
222712	Iran
222713	Iran
222715	Iran
222776	Iran
223764	Afghanistan
223765	Afghanistan
225557	Africa
226445	Israel
226460	Iran
226634	Iran
227202	Japan
227203	Japan
227205	Japan
228237	Israel
228238	Israel
229604	Iran
229605	Iran
229686	Iran
229748	Iran
229749	Iran
234287	Portugal
234603	New Zealand
240532	Iran
240533	Iran
242906	Afghanistan
244017	Africa
244018	Africa
244019	Africa
246029	Chile
246559	Africa
247398	Greece
248774	Africa
249008	Africa
249009	Africa
249010	N. Nigeria
249559	Thailand
250146	Pakistan
251244	India
251515	Iran
251796	Yugoslavia
253174	Yugoslavia
254428	Lebanon
254429	Lebanon
254430	Lebanon
254431	Lebanon
254622	Sudan
254623	Sudan
254624	Sudan
254716	Sudan
254735	Africa
254736	Africa
254737	Africa
254738	Africa
254739	Africa
254740	Africa
254741	Africa
254742	Africa
254743	Africa
254744	Africa
255136	Africa
255137	Africa
255139	Africa
255662	Afghanistan
260733	Sudan
269464	W. Pakistan
269465	W. Pakistan
269466	W. Pakistan
269676	Br. Honduras
269677	Br. Honduras
269678	Br. Honduras
269679	Br. Honduras
269680	Br. Honduras
269681	Br. Honduras
270140	India
270141	India
270143	Iran
270144	Greece
270145	Greece
270306	Philippines
270307	Philippines
270308	Philippines
270309	Philippines
270522	Israel
270524	Israel
270525	Israel
270545	Sudan
270546	Africa
270547	Africa
270548	Africa
270549	Africa
270550	Africa
270551	Africa
270562	South Africa
270563	South Africa
270564	South Africa
271132	Africa
271133	Africa
271466	India
271747	Afghanistan
271749	Afghanistan
271750	Africa
271751	Africa
271752	Africa
271767	S. Africa
271769	S. Africa
271770	S. Africa
271771	S. Africa
271773	S. Africa
271774	S. Africa
271775	S. Africa
271776	S. Africa
271777	S. Africa
271778	S. Africa
271779	S. Africa
271981	Africa
271982	Africa
271983	Africa
271984	Africa
271985	Africa
271986	Africa
271987	Africa
271988	Africa
273479	Ethiopia
273480	Ethiopia
273481	Ethiopia
274561	Portugal
274785	India
274794	Pakistan
274795	Pakistan
275628	W. Pakistan
275631	India
275632	India
276444	Jordan
276445	Jordan
276657	U.S.S.R.
276658	U.S.S.R.
276659	U.S.S.R.
277279	India
277970	Turkey
277971	Turkey
277972	Turkey
277973	Turkey
277974	Turkey
277975	Turkey

Plant Introduction - continued:

Citrullus vulgaris, con't.

277976	Turkey
277977	Turkey
277978	Turkey
277979	Turkey
277980	Turkey
277981	Turkey
277982	Turkey
277983	Turkey
277984	Turkey
277985	Turkey
277986	Turkey
277987	Turkey
277988	Turkey
277989	Turkey
277990	Turkey
277991	Turkey
277992	Turkey
277993	Turkey
277994	Turkey
277995	Turkey
277996	Turkey
277997	Turkey
277998	Turkey
277999	Turkey
278000	Turkey
278001	Turkey
278002	Turkey
278003	Turkey
278004	Turkey
278005	Turkey
278006	Turkey
278007	Turkey
278008	Turkey
278009	Turkey
278010	Turkey
278011	Turkey
278012	Turkey
278013	Turkey
278014	Turkey
278015	Turkey
278016	Turkey
278017	Turkey
278018	Turkey
278019	Turkey
278020	Turkey
278021	Turkey
278022	Turkey
278023	Turkey
278024	Turkey
278025	Turkey
278026	Turkey
278027	Turkey

Citrullus sp.

174812	India
179876	India
248178	B. Congo
274035	South Africa

Florida Report

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

G. B. Killinger

Several thousand accessions, both seeds and plants, were received by Florida researchers, nurserymen, landscapers and homeowners during the year. The introductions were quite evenly distributed between pasture and forage species, vegetables and ornamentals with most of the seed coming from the Plant Introduction Station at Experiment, Georgia and the vegetative material from the Glenn Dale or Chico Stations.

Dr. S. C. Schank, Digitaria breeder, reports the following more winter-hardy Digitarias as currently being included in an interspecific hybridization program:

P.I. 208287	P.I. 209176
P.I. 208380	P.I. 209368
P.I. 208381	P.I. 209579
P.I. 208925	P.I. 213472

Digitaria introductions which are more winter-hardy are need in Florida.

Alfalfa introductions, P.I.'s 196221, 196222, 196228, 196232, 196233, 196234 and 196235 from India, show promise as noted by E. S. Horner, who is using this material to acquire a broad gene base population and is then making selections for persistence. Horner also reports white clover, P.I.'s 214207 and 214208, from Israel as having shown good persistence and blooming well. These will be used in his breeding program.

Bromus catharticus, P.I. 189612, has survived the summers and yielded highest of six rescuegrass varieties. Selection for better summer survival will be attempted, according to A. J. Norden.

The Range Cattle Station has received 248 warm-season and 63 cool-season grasses and 59 warm-season legumes as reported by J. E. McCaleb. Paraguay 22 bahia PI 158822, Digitaria sp. no PI and Cynodon plectostachyus PI 224152 are in grazing trials. Replicated plots of Paraguay 22, Digitaria pentzii (279651 and 279652) and others are being evaluated. Increase blocks of Cynodon plectostachyus 225597, Cynodon plectostachyus X Coastal Bermuda numbers 5, 9, 11 and 14, Brachiaria humidicola 257678, Chloris ventricosa 246334, Paspalum nicorae (Brunswick grass) SCS 20-672, Digitaria pentzii 279651 and 279652 have been established in areas of 4000 square feet to two acres as noted by McCaleb.

R. W. Wallace at the Quincy station reports plantings of Cynodon dactylon 255447, 255453, 292247, and 211021, Paspalum dilatatum 202300, 222812, 235068, 274081 and 271592. Paspalum notatum 158817 and 284174, Trifolium vesiculosum 234310 and several Vicia species as showing the most promise but these have not been grown over sufficient time for proper evaluation.

Erucastrum abyssinica P.I. 243913 appears favorable as winter oil seed crop as reported by Philip Westgate at Sanford and G. B. Killinger at Gainesville. Safflower (Carthamus tinctorius) plantings of commercial varieties and introductions appear to be very susceptible to diseases in Florida and hold little promise according to Westgate and Killinger. Crambe abyssinica has not produced sufficient seed to be promising at Sanford or Gainesville and has been winter killed for the past two seasons.

The West Florida station has tested a number of Trifolium, Medicago, Lotus, Festuca, Phalaris, Phleum and Lolium species as reported by Leonard S. Dunavin. The more promising P.I. numbers are: Trifolium repens 282380, 282370, 253322 and 251866; T. hybridum 206763; T. hirtum 234050; T. vesiculosum 233782, 233816 and 234310; T. resupinatum 180492; Lotus corniculatus 260012 and Festuca arundinacea 234047.

R. J. Allen, Jr. of the Everglades Station notes the best introduction to date is Digitaria pentzii 279651 (UF 222 or A24). This grass is equal to or superior in some respects to pangolagrass (Digitaria decumbens). Only 6 from over 50 Buffelgrass selections are being maintained and these are PI 263509, 155087, 161633, 243199 and F 1080 and F 319 numbered by SCS. Several Rhoadesgrass (Chloris gayana) selections 210690, 213470 and 203851 show some promise. Panicum coloratum selections, 209002, 263603, 263605 and 263607, could possibly be used in the Everglades. Other grasses and legumes are being evaluated.

Mr. Neol R. Lake, Superintendent of the Grounds Department, University of Florida, has found two Damnacanthus indicus introductions 274764 and 275494 to be of particular interest as landscape plants for Northcentral Florida, as well as D. macrophyllus, variety giganteus 235317. These plants have stood the cold and heat and are compact and of fine texture. Over twenty other ornamentals are growing or being evaluated by Mr. Lake.

The Ornamental Horticulture Department has the following plants: Metasequoia glyptostoboides 'National' and 12 Osmanthus cultivars along with one intergeneric hybrid, X Osmarea burkwoodii which survived the 1963-64 winter under saran shade as reported by S. E. McFadden. Others being evaluated by McFadden include P.I.'s 242241, 242240, 238030 and 242236; variegated leaf selections of P.I.'s 231949, 235973, 242292, 242235 and 242291. These are all ornamental plants.

James M. Crall and J. A. Mortensen report from the Leesburg Station that cantaloupe (Cucumis melo) 164756 from India is resistant to powdery and downy mildews and to fruit rot. This introduction is being used in a breeding project in a search for cytoplasmic male-sterility. A number of male-sterile plants have been obtained in backcrosses but their practical value has not been determined. Other C. melo introductions in this breeding program are: 134200, 165525, 171596, 182187 and 211937. Watermelon (Citrullus vulgaris) 175665, 179876, 183217, 194927 and 248178 are being used in a breeding program in a search for male-sterility. An additional 50 introductions have been received to broaden the scope of the research as well as receiving P.I.'s 186975, 189225, 189317 and 255136 reported to be resistant to gummy stem blight and to be used in a breeding program.

The Subtropical Station is investigating the P.I. Okra Collection and according to J. W. Strobel will screen these for resistance to Verticillium wilt.

V. L. Guzman at the Everglades Station reports the testing of P.I.-numbered carrots and cabbage with three of the cabbage selections, 263065, 263061 and 263059, to be replanted for further evaluation.

Industrial use plants grown at Gainesville and reported by G. B. Killinger include Hibiscus cannabinus Linn (Kenaf) which shows promise when grown on moist flatwoods soils of producing 8 to 10 tons or more of dry plant material for pulp purposes. Everglades 41 (Kenaf) appeared more productive than any P.I. of either Kenaf or Crotalaria. Sunflower (Helianthus annus) introductions (42) are being grown in Gainesville for the first time, and as of July 1 appear to be well adapted with a good seed crop expected. Erucastrum abyssinica, P.I. 243913, an introduction from Ethiopia, produces over 1500 pounds of seed per acre in spite of adverse weather, cold and dry, and is an easy crop to combine.

Safflower (Carthamus tinctorius L.) varieties and introductions were destroyed by diseases, Stemphylium and others, in late spring and does not appear adapted to being grown in Florida.

Digitaria decumbens and Paspalum notatum plants and seeds respectively have received Cobalt 60 Gamma radiation and have been space planted trying to find a mutation with more cold tolerance or improved forage and pasture attributes.

Paspalum nicorae introductions P.I.'s 202044, 276248, 276249 and 284171 have made satisfactory growth and may be acceptable as pasture species. Siatro (Phaseolus atropurpureus) P.I. 296959 from Australia, has made excellent summer and late fall growth until frost and has perenniated from last season. This bean-type legume looks promising as a pasture plant for Northcentral Florida. Digitaria pentzii introduced from Taiwan as P.I.'s 279651 and 279652 in March of 1962 were winter killed at one location but have survived more severe cold at the Beef Research Unit on a Leon fine sand soil. 'Abon', a new giant-type of Persian clover, has yielded as much forage as white or red clover at Gainesville for one season and shows promise.

Seeds of many summer and winter legumes and grasses failed to germinate this past season.

Generally favorable reports have been made on ornamental plants and vegetative material furnished from Glenn Dale and Beltsville; however, it would be highly desirable if such live plant material could be mailed out over the weekend at least by Monday so it would be received by the cooperator before Saturday, when most agencies are closed. Many shipments arrive and lie over the weekend in an express truck and are often in poor condition by Monday. Most ornamentals have been well-packed, tight in the package; however, a few have arrived loosely-packed and badly damaged from knocking around inside the package. These are merely observations and are not to be construed as criticism.

Grasses, legumes, vegetables, fruits, nuts for industrial use and ornamentals will continue to be requested and tested or used in breeding programs in Florida.

Georgia Report

A. H. Dempsey

A total of 1,107 introductions were received by state and federal workers in Georgia during this year. There is increased interest in introductions of ornamentals. Commercial nurserymen and cooperators continue to obtain direct from Glenn Dale, Maryland most of the ornamental stocks.

Report from Dr. George Tereshkovich, Horticulture Department, Hatch-174 (S-9). Evaluation of New Ornamental Plants.

Approximately 100 new perennial ornamental plants and cuttings were obtained from the U.S.D.A. Ornamental Plant Introduction Station, Glenn Dale, Maryland and the U.S. National Arboratum, Washington, D. C. These plants will be grown to transplantable size before being set in various locations in the State to determine their potential usage. Data on plant vigor, habit of growth, tolerance to sunlight, general appearance, and disease and insect resistance were obtained on 34 Coleus P.I. selections.

As they become available, new ornamental plants will be obtained through the Southern Regional Plant Introduction Station and the U.S. National Arboratum. Presently, additional trials with Coleus are being conducted and several new ornamentals are being propagated so that a thorough evaluation can be made of these new plants.

Report from Dr. John Massey, Agronomy Department, Hatch 172 (S-9).

Experiments to study the effect of plant population on the seed yield of Cassia occidentalis and Vernonia anthelmintica were planted in 1963. Using split-plot designs, three plant spacings were superimposed on three row spacings for each of the species. The spacing combinations used gave plant populations ranging from 44,000 to 131,000 plants per acre.

The average Cassia yield was 1851 pounds of seed per acre with no significant yield difference between treatments. Because of severe seed shattering, the Vernonia produced no reliable yield data. However, based on weights of seed from some of the plots, yields as high as 1200 pounds were indicated. Heavy plant branching seemed to compensate for the low plant populations. Generally, plants did not branch at 131,000 plants per acre, while at 44,000 plants per acre they branched almost to the ground. These experiments are being repeated in 1964.

This year fertility studies with Vernonia and Ricinus were initiated. Four levels of a complete fertilizer were applied in randomized complete blocks. The fertilizer levels were 0, 30-30-30, 60-60-60 and 90-90-90 with part of the nitrogen applied as a side dressing. Good stands were obtained in these plantings.

Report of Dr. David Cummins, Agronomy Department.

The following tests are in progress this year:

1. S-9 Pulp Evaluation Test - consists of 6 entries including Kenaf, okra

and Crotalaria juncea.

2. Kenaf Pulp Test - consists of 6 entries in a Latin square design. In cooperation with Florida Everglades Experiment Station (USDA).

3. Kenaf-Crotalaria Pulp Storage Test - In cooperation with G. A. White, USDA, Beltsville, Maryland. To test pulping quality of material after extended periods of storage. Material will be stored in the dry and outside unprotected from the weather. This information is important to industries keeping a stock pile of pulp material.

4. Sunflower - 4 varieties to be tested for seed production and total yield and pulp quality.

5. Panicum maximum and other species - consists of 80 plots of P.I. materials (non-replicated) to be clipped for evaluation as a grazing or hay crop.

Report of Dr. Ian Forbes, USDA, CRD, Tifton, Georgia.

A. Forage Grass Cytogenetics - In recent years, 1952-61, numerous P.I. accessions of Dallisgrass (Paspalum dilatatum) and Behiagrass (Paspalum notatum) have been subjected to cytogenetic analysis. The results of these studies have provided a better understanding of the breeding behavior and possibilities of improving these species as forage crops. In the case of P. notatum, the inheritance of apomixis (which occurred in introduced tetraploids) was elucidated sufficiently well that it was possible to manipulate this valuable character in the Bahiagrass breeding program at Tifton.

   During the years 1954-63, P.I. accessions of several Bermudagrass species (Cynodon spp.) were subjected to cytological analysis. The information resulting from this study had indicated promising new approaches to the improvement of Bermudagrass.

B. Screening Desmodium Species - Numerous accessions of Desmodium species are being screened in an effort to find a species that appears sufficiently adapted and productive to encourage an intensive breeding program aimed at producing an improved perennial forage legume variety for southeast United States. Thus far, numerous accessions have been evaluated for disease resistance, tannin content, perenniality and productivity. This program is young (begun in 1961) and thus far no decision has been made regarding the species most likely to be useful.

C. Blue Lupine Breeding - P.I. accessions which have been most valuable in this program include: the Swedish-bred variety 'Borre' for its sweet gene, iucundus; a selection from P.I. 168535 from Portugal for its gene for resistance to anthracnose, An; and a second selection from P.I. 168535 that carries a gene for gray leafspot resistance, $g^{1}2$. 'Borre' was one of the parents of the marked variety 'Blanco'. Both 'Borre' and the anthracnose-resistant selection out of P.I. 168535 are included in the ancestry of a yet-to-be-released disease-resistant, marked variety.

KENTUCKY - NEW PLANTS PROJECT

W. H. Stroube

Five cooperators from the Departments of Agronomy, Horticulture and Plant Pathology received 67 plant introductions from August 1, 1963 to June 1, 1964. These included:

Ornamentals -	16 genera,	19 species,	49 accessions
Vegetables -	1 genus,	1 species,	1 accession
Legumes -	2 genera,	10 species,	14 accessions
Miscellaneous-	1 genus,	1 species,	1 accession

Fiber Crops

Two fiber crops were grown at Lexington in 1963. *Crotalaria juncea* did not germinate well in early plantings and late plantings did not produce adequate fiber to be profitable. Severe seedling damage by unidentified insects was reported.

Kenaf, *Hibiscus cannabinus*, was grown for the third year. A replicated planting was made on Captina silt loam soil on May 11, 1963, to study the effect of row width and plant population on yield. The planting was made with a Columbia planter on a well-prepared seedbed. The seed was covered about 3/8 inch deep and emerged in about four days. The plants bloomed on about October 15. Small observational plantings made at weekly intervals over an 8-week period indicated that date of planting had little effect on date of bloom.

Plot size was 10 1/2 by 12 feet long. Plots were trimmed to 8 feet in length for harvest. In each row-spacing the outside rows harvested were 42 inches apart. The number of rows harvested was 7, and 2 per plot for the 7-, 14- and 42-inch spacings, respectively. The plants were cut about 3 inches from the ground level on November 8 and weighed without removing the few leaves that remained on the top foot or so of the plants. Weighed samples were artifically dried for about 96 hours at 120° F. After obtaining the dry weight for the whole plant, the leaves and small stems were removed and the stem-dry-weight obtained. These weights were converted to a per-acre basis. Data obtained from this study are reported in Table 1.

Table 1. Average data from a replicated planting of Kenaf at Lexington, Kentucky. Planted on May 11, 1963. First killing frost October 29, harvested November 8.

Row Width	Seeding Rate*	Plants/ Acre (1000)	Plant Ht.(in.)	Stem Diam.(mm)	Dry Matter (lbs./A) Whole Plant	Stem
7"	Low	148.1	96	13.0	12927	10688
7"	High	217.8	93	11.2	12897	10466
14"	Low	82.8	100	14.0	11370	9152
14"	High	126.3	97	14.2	11971	9718
42"	Low	22.7	110	24.2	9533	7045

* Seeding rate: Low, 6 seed per foot of row; high, 9 seed per foot of row.

It is evident from this and previous data that approximately 5 tons of dry stems can be produced under Kentucky conditions. Data also indicates that when harvested from one to two weeks following the first killing freeze the plants will contain about 67% water. The handling of about 5 tons dry matter, 10 tons of water and a ton of unwanted plant parts presents a serious harvest problem.

Oil Crops

Indian Ironweed, Vernonia anthelmintica, was grown for the second year. A test designed to evaluate two-row spacings and three within-row rates was seeded on March 11, 1963. Row spacings were 14 and 21 inches with densities of 6, 9 and 12 plants per foot of row. The Vernonia plants developed slowly and weeds, particularly lambsquarter, gave considerable competition. In some cases the desired densities were not obtained, so data from all densities within row-widths were combined.

These trials were harvested by hand on September 20 and 21. As Vernonia is indeterminate in flowering and seed maturation, three lots of seed were harvested. The plants were harvested with care and shaken over a canvas to collect the seed that would shatter at that time. The stalks were then loosely bundled and cured in a plastic greenhouse. After curing 10 days, shattering seed was again collected and the remainder removed by threshing. Data from this test are reported in Table 2.

Table 2. Agronomic data obtained from a Vernonia planting seeded May 11, 1963 and harvested September 20 and 21 at Lexington, Kentucky.

Row Width	Plants /Plot	Plant Ht.(in.)	Seed Yield - Lbs/A		
			Shattered 1/	Threshed	Total
14	63	64	971	274	1245
21	52	63	905	294	1199

1/ Seed shattered at time of harvest not included. Yields reported are those obtained after curing 10 days.

In a second study, Vernonia was planted at weekly intervals in 21-inch rows and harvested at three different dates. The data from this test are reported in Table 3.

Table 3. Yield and other data from a planting of Vernonia at Lexington, Kentucky in 1963.

Planting Date	Days to Bloom	Plant Ht. (in.)9/18	Seed Yield - Lbs/A		
			9/18	9/24	9/30
4/22	64	54	480	612	132
4/28	59	57	444	744	580
5/5	57	60	840	812	676
5/12	54	63	652	780	808
5/19	59	63	1056	744	1092
5/26	69	61	1296	980	948
6/3	61	60	884	804	792
6/10	63	59	912	904	768
6/17	69	49	524	716	692

Data on Vernonia indicates that about 1,000 pounds of seed per acre may be secured under Kentucky conditions. The best time of planting appears to be about mid-May.

Seed samples from these tests were submitted for analysis. Results of the analyses appear in the 1963 "Vernonia Research Summary" compiled by White and Haun.

Climatic Data for Kentucky During 1963

	Apr.	May	June	July	Aug.	Sept.	Oct.
Inches of rainfall	1.61	3.48	3.27	7.18	4.14	0.37	0.33
Departure	-2.43	-0.37	-1.45	+3.20	+0.93	-2.43	-1.95
Av. Temperatures	57.3	62.8	72.0	73.6	72.5	66.6	63.9
Departure	+2.9	-1.7	-1.6	-3.8	-3.5	-2.7	+5.8

The last freeze was recorded on April 20 and the first in the fall on October 29.

REPORT OF PLANT INTRODUCTION ACTIVITIES IN LOUISIANA DURING 1963-64

Julian C. Miller

Some 337 accessions were introduced into Louisiana during the past year. These consisted of sweet and white potatoes, strawberries, peppers, and cantaloupes; however, most of the introductions during this period were ornamentals. A detailed file of these is on record in my office.

We are continuing to investigate the possibilities of Crambe abyssinica, Cassia occidentalis, Crotalaria juncea, Kenaf, okra and Vernonia. It would seem that Cassia occidentalis could be developed into a commercial crop without too much change in the present-day equipment. However, it has been determined that, when there is an excessive amount of rain, a considerable amount of shedding of the lower leaves occurs. Nevertheless, approximately 250 pounds of seed were produced on a quarter of an acre. A larger planting is being made.

The Crambe abyssinica withstood the winter. However, only a small harvest was made. It was not possible to combine the planting as had been planned; therefore, all of the seed was not harvested.

There is no question that the fiber crops, such as Kenaf, Crotalaria juncea and okra can be grown successfully; however, the Crotalaria lodges and would not be as satisfactory as the Kenaf or okra. Also, due to the fact that the okra reseeds itself and the other two crops do not under conditions in this state, I would be in favor of okra as a fiber crop in this area. This season we shipped 500 pounds of okra stalks to the laboratory at Peoria to be tested in the manufacture of paper. They have now advanced to a larger pilot plant operation in this testing. We sent the Louisiana Green Velvet variety. Dr. Wolff reported that okra is one of the best fiber crops that he has tested. After the Louisiana Green Velvet has been picked for the fresh market, from three to five tons of stalks per acre can still be harvested. This should be done after the plants have been killed by frost and have had an opportunity to dry, which would mean in January or February.

Dioscorea. This crop is still being investigated. Sufficient preliminary work has been done to indicate that it can be grown successfully. The young yams could still remain in the ground over winter while the temperature is down to 14 or 15 degrees. We recommend that plants be grown from two to three years before harvesting.

Sweet potatoes. We are still introducing varieties and collecting sweet potatoes in the South Pacific in a search for new characters that have not been discovered.

Irish potatoes. We are working closely with the Irish Potato Introduction Station at Sturgeon Bay, particularly with those introductions that are frost resistant. We are making progress and have isolated very good lines, which are being crossed with our own selections. These will be intercrossed with resistant selected seedlings. The frost-resistant character is recessive; therefore, we must cross parents which carry this character.

Domestic Fruit Exploration Project

Stone Fruit (Plums and Peaches)

A number of plum selections were collected from different locations in Louisiana and transplanted at the Idlewild Experiment Station located about 30 to 35 miles north of Baton Rouge. These were grown through the first fruiting season. However, a severe outbreak of phony peach disease was noted throughout the planting and into the adjacent peach planting. Buds were taken from the most-promising plum selections and were budded as dormant buds on peach seedlings in 1963. All of the plum planting and most of the peach varietal and selection plantings were destroyed because of the phony infection. We failed to realize that a problem such as this would arise, and at this time, no out-of-state stone fruit plant material additions are being accepted for the Idlewild planting unless it is certified as being virus-free.

Four seedling plums, 4 seedling peaches, 3 seedling cherries and 1 seedling apricot were produced from pits from Mexico. These were collected by Dr. J. C. Miller, Head, Department of Horticulture, L.S.U. in 1963.

A progressive peach fruiting program is under way at two locations in Louisiana, the North Louisiana Experiment Station at Calhoun and the Idlewild Experiment Station at Clinton; and about 800 seedlings are being grown each year at these locations. As soon as they are old enough, they are evaluated and rebudded, or discarded if they do not show promise. A number of very promising selections are under study as potential varietal possibilities, many of which will be adapted to the Gulf Coast area. Some of these are presently in test plantings in other cooperating states. This work is being conducted by Mr. P. L. Hawthorne.

Pome Fruits (Apples and Pears)

Far fewer pome fruit selections have been made than stone fruits in the domestic explorations in the Gulf Coast area. This is not surprising in view of the general climatic limitations on good performance of pomes. It is surprising, on the other hand, to come across a rare example of a pome fruit that has apparently grown and fruited well for a period of years in these areas. This may be merely an example of local conditions especially favorable to the specimen in question, or the tree may represent clonal material of potential value for the entire region. Testing of these materials in central locations can do much to answer the question.

At the present time, the number of introductions is as follow: 51 apples from Louisiana, Mississippi, Georgia and Alabama, including new grafts, and 16 pears. Many of them have fruited, and some of them look fair. Budwood is now available in limited quantity. In addition to the domestic introductions, we have approximately 4000 apples, 2000 pears and 100 plant introductions. We also have 25 to 30 standard varieties of apples and pears under test at this time.

Fire blight, the most common disease of pears and apples, is showing up and has eliminated some of the trees, but others show a high degree of resistance. We knew that this would be a distinct problem, but every effort is being made to breed varieties that possess a high degree of resistance. Bitter rot will become more of a problem now that fruiting age has been attained by some of the trees. I would say, however, that some distinct progress is being made in our research program to develop fruits for home and commercial orchards along the Gulf Coast.

This part of the fruit program is being conducted by Dr. E. N. O'Rourke, Jr.

MISSISSIPPI AGRICULTURAL EXPERIMENT STATION REPORT

H. W. Bennett

Workers with the Mississippi Agricultural Experiment Station, USDA, and private individuals during 1963-64 have made use of 352 plant introductions.

Over 1200 Pisum introductions have been tested for sources of resistance to Ascocyta.

Several alfalfa introductions are showing promise.

Domestic exploration in 8 southern counties has collected:

Apples, 44	Pecans, 9
Peaches, 20	Figs, 4
Plums, 26	Crabapples 2
Pears, 23	Chestnuts 1

P.I. numbers have been assigned to 13 apples and 1 pear.

A trip to several new counties is contemplated in August. A trip for budwood collection is contemplated for February.

At least 7 introductions are now in advanced breeding lines at the Mississippi Station.

A contributing project has and is being submitted.

NORTH CAROLINA - NEW PLANTS PROJECT

W. T. Fike

Eleven cooperators received 160 introductions from August 1, 1963 to July 22, 1964. The breakdown is as follows:

Crop	P.I.'s	Genera	Species	Cooperators
Ornamentals	105*	34	43	5
Grasses	22	2	3	1
Vegetables	13	4	4	2
Sunflowers	11	1	1	1
Industrial Crops	4	3	3	1
Legumes	5	2	3	1
Total	160	46	57	11

* Most of these 105 introductions were obtained by each of the 5 cooperators.

The above introductions have just been planted and little is known of them. Hundreds of additional plant introductions received prior to this year are still being evaluated and many have been incorporated into the various breeding programs. It may be ten or more years before an introduction can be fully evaluated either as the original PI or as a supplier of a specific trait.

Varieties released by the North Carolina Experiment Station

Gem, a new sweet potato variety was developed from crossing several commercial varieties, a number of breeding selections and PI-153655 from the Tinian Islands. The latter has a high degree of wilt resistance. Horticulture Information Leaflet No. 133 "Gem" is attached for general information.

A new peanut variety (AC 333) will shortly be released by the N.C. Experiment Station in which PI 121067 collected by W. A. Archer in 1936 is used as a parental material. Very few of the lines collected by Archer are now available but with our present local and Federal storage facilities new introductions should not be lost. AC 333 originated from a cross NC 1 x C12 made in 1953. C12 originated from a cross PI121067 x NC Bunch made much earlier.

AC 333 plants are of intermediate runner-bunch growth habit tending to be more runner than bunch. It is approximately 10 days later in maturity than NC 2. It is comparable to NC 2 in its resistance to the prominent peanut insects of the Virginia-North Carolina belt. Yields of AC 333 and NC 2 are quite comparable but more important to the buyer, however, is the fact that the AC 333's average fancy size pod per centage was 78.7 compared to an average of 36.7 per cent for NC 2; AC 333's average extra-large kernel per centage was 43.6 compared to 30.4 per cent for NC 2. AC 333's average cracked pod per centage was 3.1 compared to 9.9 per cent for NC 2.

Plant Introductions of Special Interest.

PI 3814 Lycopersicon esculentum - A pear shaped tomato that is resistant to Southern Bacterial Wilt. Has been incorporated into the breeding program.

PI 231798 Pear - The young trees of this selection bloomed and are fruiting for the first time this year. These trees are growing on our Piedmont Experiment Station. The only value to report at this time is that each of the trees bloomed late and have set a fair crop in 1964 when most of the trees of the 30 different varieties and selections of pears in this orchard have very little or no fruit due to the late freeze. The young fruit looks good at this time, but no evaluation of its quality has been made. No fire blight has been found in this orchard this year, so no evaluation of its resistance to this disease is possible this year.

Resistance of Cabbage Varieties to Cabbage Caterpillars, Fletcher, N.C.

Dr. R. B. Chalfant screened thirty-eight varieties of cabbage and related Brassica oleracea for resistance to cabbage caterpillars. Plants were scored for caterpillar feeding damage when most varieties were heading (July 22) and when most were mature (August 15). Insect counts were made on July 24 by recording larvae of cabbage loopers and imported cabbage worms.

Table 1 shows the varieties arranged in ascending order of damage and looper numbers. None of the varieties showed marked carterpillar resistance. The least damaged varieties were reds and savoys. Varieties commonly used in western North Carolina, namely 'Resistant Danish','Oakview' and 'Badger Bull Head' were among the most susceptible.

Some varieties were markedly different between the July 22 and August 15 counts. Analysis showed a highly-significant interaction between varieties and counting dates. There was no correlation between the July 24 larvae counts and damage.

Evaluation of Potential Industrial Crops and Pulp Crops.

A regional oil and seed gum crop test consisting of the following nine entries was evaluated in 1963:

Cassia alata	PI 279691	Crotalaria sp.	PI 279696
Cassia leptadenia	PI 279692	Ipomoea sp.	PI 279715
Cassia leptocarpa	PI 279693	Salvia texana	PI 279722
Cassia occidentalis	PI 279694	Schkuhria wrightii	PI 279700
Crotalaria longirostrata	PI 279695		

The only crops from this group that produced enough seed for harvest were Cassia occidentalis and Crotalaria longirostrata. Very poor stands resulted from seed of low germination. Most of these plants, native to the sub-tropics, did not flower and if flowering took place, did not seed.

Table 1. Cabbage caterpillar resistance. Varieties arranged in order of increasing damage and No.s of cabbage loopers. Fletcher, N. C. 1963.

July 22		August 15		July 24		
Variety	% Damage	Variety	% Damage	Variety	No. Loopers	% Large Loopers
Dwarf Siberian Kale	20	Dwarf Siberian Kale	30	Dwarf Siberian Kale	4	25
246088	28	246088	52	246090	8	12
Dark Green Savoy	30	245014	56	246094	10	20
Mammoth Red Rock	30	Red Danish	59	Vanguard II	20	35
245014	30	246094	60	Copenhagen - 86	21	14
245019	31	246084	60	263065	21	10
244999	31	Round Red Dutch	61	245014	21	10
246094	31	Mammoth Red Rock	61	246064	23	17
Red Danish	32	Savoy Perf. Drum Head	61	224861	23	35
246071	32	246052	64	Emerald Cross	28	11
Round Red Dutch	32	244999	64	263068	29	14
Savoy Perf. Drum Head	32	264064	64	Dark Green Savoy	31	29
Emerald Cross	35	263068	65	Resistant Danish	32	9
261604	36	Emerald Cross	66	246052	32	12
246084	36	263065	66	Waltham 29	33	18
Jade Cross	36	263060	66	263060	33	9
263060	37	246071	67	244999	33	9
Vanguard II	38	Jade Cross	68	Market Topper	40	22
246092	39	Waltham 29	68	246084	43	9
263065	40	Stein's Flat Dutch	68	Savoy Perf. Drum Head	48	25
Waltham 29	40	246090	68	Oakview	52	8
Long Island Improved	40	Long Island Improved	68	Round Red Dutch	54	30
246052	41	Copenhagen - 86	69	Badger Ball Head	55	15
Copenhagen - 86	42	Vanguard II	70	Jade Cross	56	23
246064	42	O. S. Cross	70	246055	56	14
246055	42	Market Topper	70	Snowball	58	5
263068	42	224861	70	Surehead	59	25
Snowball	42	246055	71	Long Island Improved	63	16
225861	44	246092	72	Stein's Flat Dutch	64	36
246090	44	Dark Green Savoy	73	246092	64	16
Badger Ball Head	45	Surehead	73	O. S. Cross	66	33
Market Topper	47	Oakview	74	261604	71	14
Stein's Flat Dutch	47	Resistant Danish	77	246071	75	19
Resistant Danish	48	Snowball	77	245019	75	9
Oakview	49	245019	77	Mammoth Red Rock	81	14
O. S. Cross	54	261604	82	Red Danish	82	11
Surehead	56	Badger Ball Head	86	246088	91	12

A regional pulp crop test containing four entries was also grown. Entries included Kenaf, 'Everglades 41' and 'Everglades 71'; and Crotalaria juncea, 'Texas L-374' and 'Brazilian 55617'. A 5-ton-per-acre dry matter yield of these fiber crops is necessary for a potential economical return per acre. Both Kenaf varieties exceeded this figure.

Table 2. Dry Matter Yields of Pulping Crops - 1963

Crop	Variety	Willard tons/acre	Willard Lt.	Plymouth tons/acre	Plymouth Ht.	Plymouth Diameter
Kenaf	Everglades 41	6.6	10	4.2	8.2	12 mm
Kenaf	Everglades 71	6.6	10	5.1	8.4	13
Crotalaria juncea	Texas L-374	3.0	8	2.8	7.6	8
Crotalaria juncea	B-55617	4.0	10	3.6	8.2	9

The following crops are in the advanced stage of testing:

Cassia occidentalis - This seed gum crop does very well in North Carolina. Hand-harvested yields per acre of 1900 pounds have been obtained. Combine yields of 1000 pounds per acre have been obtained. The seed, however, is toxic to chickens.

Cassia bonariensis - This crop yielded 2478 pounds of seed per acre when harvested by hand. Seed can be combined.

Vernonia anthelmintica - A plant-spacing test was conducted in 1963. This test was conducted at Plymouth. Vernonia was planted in 7, 14, 21, 28 and 35-inch row spacings. Plants were thinned to 1, 2, 4, and 6 plants per row foot. Many plants died from root rot after thinning. Seed was harvested after frost from the plants with a thresher and swept up from the ground with a heavy-duty vacuum.

Table 3. Yield of Vernonia in pounds per acre at five-row spacings and at varying in-the-row spacings.

Row Spacing (in.)	Plant Ht.(ft.)	Plants per row foot: 1	1.5	2	2.5	3	3.5
		Pounds/acre					
7	5.6	645	795	528	-	-	-
14	5.4	548	427	-	-	713	671
21	5.4	586	514	425	500	-	-
28	5.2	-	239	520	-	442	656
35	5.2	445	449	400	428	605	-

1. Yields were lower than normal due to late planting.
2. Higher yields were obtained at the 7 and 14-inch row spacings.
3. Plants in the wider rows had thicker stems and lower branches which made direct combining difficult.

A seven-acre field was set in three-foot rows. Rows were cultivated twice and hand-hoed twice. There were very few weeds in the field

Plans called for direct combining of this field at the first frost. Combining was initiated on November 4 before frost but when most of the leaves had fallen, and less than 10% of the seed had shattered. The stems however were very tough. Adapter pans were attached to the cutter bar to catch those seed which shattered from the plants. Combining was very slow due to the tough stems. Then the rains and winds came and most of the seed fell to the ground and was imbedded into the soil surface. Only about 25% of the seed was left for combining after the rain.

A total of 1800 pounds of seed was obtained from this field and the major portion of this came from 3 acres. When cleaned, 1500 + pounds remained. Plants in wide row spacings (possibly all spacings) cannot be combined direct due to coarseness of stems and seed shatter. The adapter pans, however, did catch the majority of the shattered seed.

Plants could be possibly windrowed, but weather would be a very important factor in North Carolina.

Plant spacing tests and defoliation studies are being conducted in 1964.

Kenaf

Plant spacing. - A plant-spacing test was planted June 7, 1963 at Plymouth, using the variety 'Everglades 71'. Rows were spaced at 7, 14, 21 and 28 inches. Plants emerged two days after seeding. Large numbers of plants were killed by Rhizoctonia root rot. The higher planting rates were not reached due to this disease.

Yields of six tons dry matter per acre were obtained with 3 and 5 plants per row foot in the 14-inch rows, 3 and 4 plants per row foot in the 21-inch rows and at 7 plants per row foot in the 28-inch rows. There were no six-ton yields in the 7-inch rows even with cultivation.

Plant diameters and heights were greater at lower densities in the row and increased as row spacings increased to 21 inches. The higher densities per row foot in the 28-inch rows caused a decrease in these characteristics over the 14 and 21-inch rows.

This experiment is being repeated in 1964.

Fertility. - A 3 x 3 factorial experiment compared 0, 30 and 60 pounds each of N, P_2O_5 and K_2O. Plants were planted in 21-inch rows and were thinned to 6 plants a row foot. At harvest, plants averaged 8.8 feet tall and 15 mm in diameter. Highest yields per acre were obtained at the higher levels of fertilization.

Table 4. Dry matter yields in Tons/Acre of Kenaf at three levels of N, P_2O_5 and K_2O.

Pounds per Acre	Fertilizer		
	N	P_2O_5	K_2O
0	6.6	6.5	6.6
30	6.6	7.1	6.5
60	7.4	6.8	7.4

A 4 x 4 factorial experiment comparing 0, 35, 70 and 105 pounds each of N, P_2O_5, and K_2O is being conducted in 1964.

1964 Seed Increase and Preliminary Evaluation (S-9):

Thirteen introductions are being evaluated at the Georgia and North Carolina Stations. These introductions are as follow:

	P. I. Number	Crop	Use
1.	296037	Brassica hirta	51% erucic acid
2.	296044	Aeschynomene sp.	Pulp
3.	296046	Crotalaria eriocarpa	Pulp
4.	296052	Desmanthus interior	Pulp
5.	296053	Desmodium sp.	Pulp
6.	296054	Indigofera suffruticosa Mill.	Pulp
7.	296055	Sesbania sp.	Pulp
8.	296056	Tagetes lucida	25% unsaponifiables
9.	296058	Trichosanthes cucumerina L.	47% conj. triene
10.	296062	Brassica sinapistrum Boiss.	54% erucic acid
11.	296079	Brassica sinapistrum Boiss.	High erucic acid, with no oxazolidieutbione
12.	296081	Cassia javanica L.	Seed gum
13.	296080	Cassia hirsuta L.	Seed gum

You will be able to see most of these prior to flowering on the field trip to Rocky Mount.

Sunflower Tests

A regional sunflower test was evaluated at four locations. Nine P.I.'s were among the ones tested.

Table 5. Summary of seed yield in pounds per acre of sunflower strains grown in North Carolina. 1963.

Entry Number	Identity	North Carolina Laurel Springs	Plymouth	Rocky Mount	Salisbury 1/
1	T 56002	----	----	1264	1971
2	NK Hybrid 1	2650	2296	2104	1784
3	NK Hybrid 2	1833	2350	1114	1652
4	VNIIMK 16.46 (P.I. 265099)	2083	1476	750	1120
5	Jdanovsky 82.81 (P.I. 265100)	1800	1446	920	1223
6	Armavirsky 93.43 (P.I. 265101)	2181	940	602	1090
7	VNIIMK 88.83 (P.I. 265103)	2415	----	1144	1116
8	Tchernianka 66 (P.I. 265104)	1610	819	782	1289
9	Stepnyak (P.I. 257641)	2235	1622	646	1746
10	Tchernianka 11 (P.I. 257640)	1765	----	1156	1555
11	VNIIMK 1646 (P.I. 262516)	2272	----	834	940
12	VNIIMK 16.46 (P.I. 257642)	1997	1255	454	866
14	Donski 695 (Morden 868)	1919	1046	930	1393
15	VNIIMK 65.40 (Morden 842)	1909	----	738	1467
21	Advent	2100	2040	754	1423
22	Mennonite G	1812	1922	704	1564
23	Arrowhead	1985	1785	736	1670
Test Mean		2040	1583	920	1404
Coefficient of variation, %		4/	4/	4/	22.4
L.S.D. at 5% level (lbs./acre)		----	----	----	430

1/ Means based on 4 replications except Entry No. 1 which was not included in analysis of variance.

4/ No analysis of variance since this was a 1-replicate test.

Plans for 1965

New Crop studies will be continued.

The North Carolina contributing project to S-9 will be revised.

Summary

1964 S-9 Report from Oklahoma
Prepared by Roy Oswalt and Ralph Matlock
Oklahoma Agricultural Experiment Station

Oklahoma researchers, nurserymen and private individuals received approximately 1442 plant introductions since July 1, 1963.

A. FORAGE CROPS:

1. Cynodon Collection: (Wayne Huffine) Approximately 540 accessions of Cynodon, including all of the described species, are now space planted in the field and ready for study. A list of the Cynodon introductions recently acquired has been prepared for distribution through the regional coordinator.

   The winter of 1963-1964 was rather mild in Oklahoma and most of the introductions that were planted in the field last year survived completely or in sufficient quantity to repropagate themselves in 1964. No conclusions can be drawn from the field studies at this time.

2. Vicia sativa: (C. E. Denman)

   Fourteen accessions of Vicia were received late this spring but because of the dry weather, they were not planted.

3. Old World Bluestems: (J. R. Harlan, W. L. Richardson and J. M. de Wet)

   Processed Series P-480, June, 1964 reports the progress on "Improving Old World Bluestems for the South".

B. PULSE CROPS:

1. Peanuts: Seed of 68 accessions were sent to Regional station May 7, 1964, from the 300 peanut introductions grown for increase and observation in 1963. Poor to very poor emergence was obtained for 67 of the peanut accessions grown in 1964. The entire group of 568 accessions are being grown in 1964 for evaluation and increase.

   The agronomic, physical, chemical and organoleptic characteristics for 33 spanish peanut introductions were evaluated in 1962 and 1963 at the Oklahoma Agricultural Experiment Station to determine the diveristy and potential of the germ plasm. The introductions tested included seven from Uruguay, ten from Nyasaland, 13 from Cuba, and one each from Argentina, Jamica and Australia. Considerable diversity was noted for the characteristics measured but none were superior to Argentine in yield and grade factors. More detailed results can be found in the 1964 Proceedings of the Peanut Improvement Working Group (Wakon RedCorn).

Fifty-three accessions of the wild relatives of the cultivated peanut resulting from the 1959 and 1961 collecting expeditions are being observed to obtain information under Oklahoma conditions. The accessions varied in their ability to produce roots from cuttings.

2. Pisum: Seven plant introductions and five varieties of field peas were evaluated in 1964. P.I. 175227 (Sp-292 and 461A) and P.I. 174918 (Sp-291A and 460A) were the highest yielders of seed and forage. The accessions matured July 6 when planted April 16, 1964.

3. Vigna spp: Of the 19 cowpea accessions that Hymowitz collected in India, eleven were relatively free of disease. P.I. 288662 (C-658) matured early but the rest were late. The best seed producers were P.I. 288657 (C-653), P.I. 288658 (C-654) and P.I. 288665 (C-661).

4. Dolichos spp: Six accessions of D. biflorus have been tested in Oklahoma. Two with very promising seed yields include P.I. 212636 (Sp-162) and P.I. 163321 (Sp-241). The remainder matured very late and produced little or no seed.

   Eleven accessions of Dolichos lablab were grown in 1963: three produced seed, six matured very late and produced no seed, and two accessions did not emerge. P.I. 288466 (Sp-388) collected by Hymowitz in the Surat district, Bardoli, India, produced over 500 pounds of seed per acre.

5. Cajanus cajan: Five new accessions of pigeon pea are being evaluated in 1964. Seed and forage (oven dry) yields in previous years have been as high as 307 and 6400 pounds per acre, respectively. P.I. 218066 and selections from P.I. 218066 have been the highest seed yielders.

6. Phaseolus: Thirty-five new accessions of P. aureus (mungbean) collected by Hymowitz were grown in 1963. The seed of each accession were small and the range for the whole group varied from 2.6 to 3.5 grams per 100 seed.

   Twenty-four accessions of P. aconitifolius (Mothbean) collected by Hymowitz were evaluated. P.I. 288578 (M-793) produced 572 pounds of seed per acre and 5878 pounds of dry forage per acre. P.I. 288574 (M-789) labelled as a moth bean was identified as Vigna cylindrica (C-674).

   Twelve accessions of P. mungo (Urd bean) were collected by Hymowitz. P.I's. 288599 (M-784), 288600 (M-785), 288602 (M-787) and 271498 (M-750) produced excellent seed yields.

7. Others: A few accessions of horsebean, Fenugreek, and lentil are being evaluated for their potential in Oklahoma.

C. INDUSTRIAL USE CROPS:

Certain oilseed, mucilage and pulp crops were evaluated in 1963 and 1964.

1. Oilseed Crops:

a. Ipomoea spp: P.I. 279698 (Sp-254) was considerably more productive than P.I. 279715 (Sp-321).

b. Momordica spp: Five new accessions from India were evaluated in 1963. Good stands were obtained for P.I. 288544 (Sp-357). The latter had larger fruit and was considerably more productive than Sp-106.

c. Foeniculum vulgare: Plantings were made on four different dates in 1963 but no stands were obtained from any of them. In 1964, four dates of planting were tried (2-17, 2-28, 3-13, and 3-26). Excellent stands were obtained for the first three dates of planting. The March 13 date appears to be the most productive. Both Sp-401 (P.I. 268383) and Sp-429 (G-11912) had fair to good stands on Kirkland soil in 1964.

d. Crambe: Seed yields were low in 1963 and 1964. In 1964, the time of planting test dates of mid-January, mid-February, and March 1 were compared. March 1 had the highest yields. The 11 new accessions from Russia are being evaluated this season. They were planted April 16 and harvested July 10, 1964.

e. Vernonia anthelmintica: In 1963 yields were 370 and 628 pounds of seed per acre, depending on the method of handling. The highest yields were obtained when the plants were cut and threshed the same day, but the oil quality was lower as indicated by low epoxy oxygen and high free fatty acid content.

2. Gum Crops:

Species of Crotalaria, Cassia and Cyamopsis were evaluated as potential gum crops in 1962 and 1963.

1. Accessions of Crotalaria intermedia produced poor stands and matured extremely late in Oklahoma tests.

   C. spectabilis accessions were very productive but shattered severely and averaged 400-500 pounds of seed per acre.

   C. retusa accessions were the most promising from the standpoint of shatter resistance but averaged only 500-600 pounds of seed per acre.

2. Cassia occidentalis, P.I. 204366 (Sp-253) was included in the 1964 guar tests. The data for four Oklahoma tests planted in rows 40 inches apart show that the mean seed yields of Brooks guar and C. occidentalis (Sp-253) did not differ materially. The height of Sp-253 averaged 17 inches taller than Brooks at the four locations. Sp-253 matured later and shattered slightly more than guar.

Seed Yield (lbs./A)

Location	Sp-253	Brooks	Test Mean	Plant Ht. (ins.) Sp-253	Brooks
Perkins	2057	1394	1197	71	46
Stratford	937	1352	1085	52	34
Mangum	2245	1950	1448	65	47
Tipton	867	1526	1195	46	37
Mean	1526	1556	1227	58	41

Guar accessions grown for the first time in Oklahoma included 142 collected by Hymowitz, and five introductions collected prior to 1948 and believed to be lost. In 1964, the remaining 48 accessions in the Hymowitz collections and those with little or no emergence in 1963 are being grown.

3. Pulp Crops

Two entries each of *Crotalaria juncea*, kenaf, *Sesbania* and okra were planted at Perkins in tests with 20 and 40 inches between rows. The kenaf and okra had higher yields using 10 inch rows while the *Crotalaria juncea* and *Sesbania* yielded more at the 20 inch spacing----The *Crotalaria juncea* and kenaf entries each had more than twice the yields of the *Sesbania* and okra entries.

In 1964, one test was planted using 40 inch spacing and two entries each of kenaf, *Sorghum*, okra and *Crotalaria juncea*.

D. FRUIT CROPS:

1. Grapes: (E. T. Johnson) The following grape accessions have been exceptionally good: Burdin 7705 (P.I. 256487) is a black wine grape; Burdin 7061 is a black grape; Seyve-villard 20366 is a white table grape; Ravat 262 is a black Burgundy wine grape; and Vidal 256 is an excellent white wine variety.

E. WEED CONTROL:

Weed control in *Vernonia anthelmintica* (Sp-464, P.I. 292522) P. W. Santelmann

Plots were planted May 20, 1964 and treated the same day. Several of the more common pre-emergence herbicides were tested for their effect on the crop. Rainfall subsequent to the treatment was good, being quite sufficient to germinate the crop and activate the herbicide. The dominant weeds at the location were various pigweeds (Anaranthus spp.). The soil was a Vanoss loam. The plots were two rows wide, 30 feet long, replicated four times, and were treated with an experimental plot tractor sprayer.

Table 1. Summary 1964 Vernonia Weed Control Study, Perkins, Oklahoma

Herbicide	Lbs./A	After 14 days: Crop Injury Rating	After 14 days: % Control Broadleaf Weeds	After 42 days: Vernonia Plant Per 2 Sq.Ft. or row**
Dacthal	10	5*	60	4.50
DNBP	6	10.	100	0.00
2,4-DEP	4	6	85	0.00
Amiben	2	2	65	8.25
Diphenamid	4	2	70	5.25
Diuron	1 1/2	9	95	0.00
Prometryne	3	8	95	0.25
CDAA	4	3	85	6.50
NPA	4	3	65	6.50
Norea	3	9	80	0.00
Atrazine	2	9	95	0.00
Linuron	1 1/2	9	100	0.00
Check	--	2	0	8.00

* Rating on a scale of 0=no injury and 10=complete kill.

** No stat. analysis run as yet, but due to stand variability it is very doubtful that a variation of less than 2.0 is significant.

F. HORTICULTURAL CROPS

1. The following accessions have been established and are being further evaluated (W. R. Kays):

P.I. No.	Genus and Species
285375	*Liriope spicata*
262712	*Betula pendula*
274838	*Ilex latifolia*
275858	*Ilex rugosa*
275859	*Ilex sugaroki*
241304	*Ligustrum campervirens*
292732	*Begonia semperflorens* 'Steffi'
292733	*Begonia semperflorens* 'Rosa teicheri'
285390	*Cotoneaster frigida*
285323	*Cotoneaster microphylla*

2. The following accessions were reported dead:

P.I. No.	Genus and Species
275053	Ardisia crenulata
266509	Salix melanostachys 'Kurome'
268123	Salix alba 'Drankenburg'
268127	Salix cinerea
266477	Salix purpurea amplexicaulis
266511	Salix wimmeriana
285381	Magnolia campbellii

3. The following accessions were received during 1962 but there is no current record of them due to personnel changes:

P.I. No.	Genus and Species
260703	Achimenes grandiflora
238684	Cyanotis cristata
242278	Medera rhombea
254745	Bauera rubioides
249458	Cephalonema polyandrum
255628	Correa bauerlenii
255007	Leptospermum pubescens
242347	Medinella venosa
254602	Myrsine retusa
241392	Oreopanox capitatum
240122	Rhynchosia pyramidalis
240045	Rogeria elegans
241339	Trachelospermum sp.
240768	Undetermined (Trachelospermum)
279746	Cryptomeria japonica

4. The following tomato accessions (L. esculentum) were collected from the Hardin material and seeds were sent to the National Seed Storage Laboratory.

P.I. No.	P.I. No.
205045	262162
205065	262939
250432	263720
250433	263721
255847	263723
255849	263725

Probably should be 205045
R. S. Matlock's letter 1/20/65 - Oklahoma State

PUERTO RICO REPORT

H. Azzam

During the period of July 1963 to June 1964, a total of 560 introductions were made. They were as follow: 171 grasses, 12 legumes, 47 grains, 21 sugar crops, 157 vegetables, 39 fruits, 109 ornamentals and 4 miscellaneous

Several of these introductions are being used as new germ plasm in various projects and some are still under quarantine.

Two date palms, Phcenix dactylifera, at Fortuna produced five racemes last year. Evaluation of their quality after curing and partial dehydration indicated low sugar content and fair quality. A few female trees are now in bloom but no males are available as yet.

Selection within the sapucaia nuts, Lecythis elleptica, is being carried on for a high number of seeds per "pod" and high oil content with good roasting flavor.

Macadamia tetraphylla selected clones from Australia were planted at Adjuntas with the hope that high elevation may promote its growth.

Planting materials of the five banana, Musa sapientum, introductions from Jamaica are being distributed in the banana areas for further evaluation. The variety 'Alta Ford' showed under field observation at Fortuna, resistance to Sigatoka disease, Cercospera musae. However, it is susceptible to wind damage because of its height. The varieties '2390', 'High Gate' and 'Governors Giant' also showed resistance and fair fruit quality.

The Chinese gooseberry, Actinidia sinensis, plants are growing very well in the mountain region and we hope to have female and male plants.

A large planting at Gurabo of the Rambutan, Nephellium lappaceum, seedlings is being established for selection. Grafted female trees will be given to our Seed Farms Division within five years. This crop should have a good exit as a new fruit for Puerto Rico.

The pink flesh bread fruit, Artocarpus communis, root cutting introduced from the French Polynesian Islands did not germinate and a new attempt is being made for introducing it again.

Eight out of a total of 32 trees of mangostan, Garcinia mangostana, produced their first fruits after 10 years from planting.

Vegetative propagation of the best selected trees of achiote, Bixa orellana is being attempted. These have resistance to mildew and are of high yield.

A total of 63 named varieties of Coleus were given to the Seed Farms Division for distribution.

Seed production of Crotalaria juncea as a crop was very successful at Isabela Substation. This was done in cooperation with the USDA to produce seeds in winter for their late spring distribution. Approximate seed yield per acre was 1,000 pounds.

Sugar beet planting looked good with a per centage of sugar of 9-21% obtained among US H2, USH5, USH6 and US75.

Three shipments of grasses containing 89, 59 and 63 accessions respectively, were received from Dr. A. J. Oakes. As of today, accessions No. 78 (Digitaria smutsii), 137 (D. pentzii) and 222 (D. eriantha) appear as dead. The rest in general seem to be safe.

One hundred pepper introductions were obtained from the Regional Station to be screened for the Puerto Rican strain of pepper mosaic virus, "P.R. PMV." Among the first group screened (after 2-3 inoculations of the seedlings), some differences in susceptibility were found:

P.I. Number	% Susceptibility	P.I. Number	% Susceptibility
124406	61	140375	51
124408	42	142825	55
124540	32	148632	85
125801	52	148634	91
125802	46	148633	64
125803	84	148635	91
125804	88	153565	62
125806	81	159230	53
127327	90	159231	54
140371	86	159232	83
140373	87	159233	68
140374	87	159235	79

Selfed seeds are being secured from some of the highly-resistant lines for progeny tests as well as the evaluation of their commercial characters. Future crosses may be necessary to incorporate this resistance into our local commercial pepper varieties.

Several other introductions are still being studied, such as: passion fruit, Passiflora edulis, variety "flavicarpa'; tree tomato, Cyphomandra betacea, 'annona'; guar, Cyamopsis tetragonoloba; lawn grasses; ornamentals and vegetables.

SOUTH CAROLINA REPORT

J. A. Martin

There were 336 P.I. accessions of seeds and plants distributed to 16 cooperators in South Carolina since July 1, 1963. These accessions included ornamentals, vegetables and miscellaneous crops.

Reports from various cooperators are presented as follows:

Mr. E. F. McClain, Assistant Agronomist, Department of Agronomy and Soils, Clemson University, Clemson, South Carolina.

I have not observed any new plant introductions in recent years. However, some accessions or their derivatives which were obtained several years ago are still being utilized and may eventually contribute some germplasm to one or more commercial varieties. These introductions are:

Pennisetum spicatum - P.I. 214330 - Self-fertile lines which combine well with inbred lines of *P. glaucum*.

Sorghum vulgare var. sudanense - P.I. 220969 - High tillering type; inbred lines have been developed from crosses with this accession.

Sorghum vulgare - P.I. 164783, 173115, 192877 and 192880 are being maintained, and test crosses are planned with male-sterile lines now being developed. A very late leafy type was found in P.I. 197050 and crossed with several types of sorghum to improve leafiness and lengthen maturity.

Mr. W. O. Freeland, The Garden Spot, 4032 Rosewood Drive, Columbia, South Carolina, 29205.

Mr. Freeland is especially interested in the cultivated *Hederas* and in the distinct cultivars of *Vinca minor*. Dr. G. H. M. Lawrence says that they have the largest collection of ivies grown in the open in the country. He was kind enough to correctly label most of the collection.

Hederas nepalensis was received from the National Arboretum during the past season. Dr. Meyer brought it from Nepal last year. It had such a strong family likeness to an ivy which came to us under P.I. 239247 and labeled *Chrysophylla*, that we have decided with the help of Dr. Lawrence that it is P.I. 239247. Dr. C. Y. Morrison in Passchristian sent us *H. nepalensis*, variety 'Chinenses'; and it, too, strongly resembles our other plants but has more diffuse white veining, especially along the veins.

As to the *Vincas*, we have P.I. 239252, *Vinca major* variety 'pubescens' which has proved much hardier than the common type - never being hurt by the cold, but retaining its stems and leaves through the most severe weather down to 4° F. The flowers, jasmine-like or pin-wheel like and deep violet in color, are on the unusual side.

Somewhere along the line we came into possession of Vinca major variety 'aurea-riticulata'. It has distinct golden netting on its leaves and the typical periwinkle blue flowers.

In Vinca minor we have fourteen distinct kinds - three with white and yellow variegation; one of the yellow-leaved ones has white blooms which look well above the new growth, which is all yellow; there are three double-flowered ones (blue, red-purple and white); Vinca minor variety 'Gutrude Jekel' has small narrow leaves and tiny pure-white flowers; Vinca minor variety 'purpurea' has the most beautiful bright red-purple blooms, and it is a good grower.

Dr. Meyer also brought us a start of Hedera colchica dentata, 'variegata'. He brought the arborescent form and was disappointed when it reverted, but we were glad it did for it will be a grand addition to southern gardens as is the Hedera colchica variety 'dentata', which has the largest leaves of any ivy we have ever seen.

Dr. William C. Frierson, Frierson's Flowers, Denmark, South Carolina, 29042.

The plants all seem to be doing well. We are particularly interested in the variegated osmanthus and are propagating both kinds as fast as possible. Many of the sasanquas we already had, but some were new and very much appreciated.

We are most excited, however, about the yellowberry crenata, and are anxious to learn its growth habit and hardiness. We have several thousand in the field, and they are shaping up well.

The whiteberry glabra we are also sold on. I had it before USDA sent it to me and we are trying to build stock of it. We have a small hedge of it from which we are taking cuttings.

J. A. Martin, Department of Horticulture, Clemson University, Clemson, South Carolina.

Cassia occidentalis was planted at Clemson, Florence, Pontiac and Blackville. A one-acre planting was made at Clemson, and 960 pounds of cleaned seed was produced. The crop was harvested with a combine. The cost of production will be in line with that for soybean production. The small plots of Cassia at Florence, Pontiac and Blackville performed well and appeared to be well-adapted to the various locations. Except for the plant's toxicity effects on animals, it appears to be a "sure crop", such as soybeans. We have had no trouble in getting stands and the crop competes well with grass and weeds. We have about 1300 pounds of seed available for any worthy purpose.

A Tephrosia vogelii test consisting of four lines planted at distances of 9, 15 and 24 inches within rows and 3 feet between rows is underway at Clemson. The object of this work is to obtain yield data, leaf-stem ratios and the average per cent rotenoids for each variety on each spacing. The rotenoid analysis will be conducted by the Federal Experiment Station in Mayaguez, Puerto Rico.

Crotalaria and Kenaf varieties were grown for determining the yield of dry stalks for paper pulp. Table 1 shows results of the test.

Table 1. Yield in pounds per acre, mean height, number of plants spacings in row for two varieties each of *Crotalaria* and Kenaf, Clemson, South Carolina. 1963.

Entry No.	Variety	Stalks* Lbs./ Acre	Height (ins.)	No. Plants Per 32 ft. Row	Spacing in Row (Inches)
1	Crotalaria juncea 374	7749	101	135	2.84
2	Crotalaria juncea B-55617	9243	127	71	5.41
3	Kenaf 41 (B-55648)	15684	135	101	3.80
4	Kenaf Everglades (A-16903, B-55611)	17419	127	98	3.92

* Dry weight basis.

Both the *Crotalaria* and Kenaf were planted on May 10, 1963, on sandy loam soil with good drainage. No irrigation was used, but sufficient rainfall during the growing season was available for optimum growth. A 5-10-10 fertilizer was used broadcast at the rate of 1,000 pounds per acre ten days prior to planting. The distance between rows was 21 inches. A good stand was obtained in 5 to 6 days. There were no weeds, insects or diseases present. The crop samples were harvested on December 4, 1963, well after frost had killed the crop.

Ipomoea parasitica grows well at Clemson. It is a vine crop and might grow on crops such as corn, sorghums, etc., and thus could be combined. If this crop has any real potential as an industrial crop, I believe we can grow and harvest it successfully.

Chufa, *Cyperus esculentus* L. will receive more attention in the future due to the recent commercial interest in the crop. One concern has expressed an interest in the commercial production of chufas to the extent of 700 tons per day during the harvest season. They are interested in extracting the flavor for use in the preparation and processing of special foods. One problem which remains untouched is the storage characteristic of chufas as related to moisture, sugar, flavor and stability of oil under various storage conditions. We hope to initiate work along this line as soon as suitable varieties are developed. Recently, we have obtained two varieties of chufas from Africa through Mr. H.L. Hyland. One variety is 'Kano' which is from Nigeria with very small tubers, about the size of cowpeas; the other variety is 'Amelekorpe' from the Volta Region, Ghana. These tubers are very large and should prove to be desirable from the standpoint of size. In addition to these African varieties, we have several others which are promising.

Luffas and gourds - For the first time at Clemson, we have one of the most complete plantings of *Luffas*, gourds and ornamental gourds for observation and evaluation. There are approximately 30 *Luffas* - 23 of these are P.I. accessions and the others have been sent in by friends from Japan, Turkey and other places. Most of the gourds (which number around 70) have been obtained from seedsmen. The *Luffas* and gourds are in many shapes, sizes and colors and offer interesting opportunities for decorative and useful purposes as well as sources of income.

Sesame and Castorbeans - Research Series No 59, March, 1964, Sesame and Castorbean Research in South Carolina in 1963, gives the results of varietal yield tests with both crops. In addition, there are the results of the sesame wilt screening test and herbicide tests.

Coleus - For many years I have been interested in the collection and evaluation of Coleus varieties. During the past ten years, 104 named varieties have been obtained from the following:

1. United States Department of Agriculture
   Plant Introduction Station
   Experiment, Georgia

2. Professor E. R. Honeywell
   Department of Horticulture
   Purdue University
   LaFayette, Indiana

3. Professor F. M. Fosler
   Department of Horticulture
   University of Illinois
   Urbana, Illinois

4. Commission of Parks
   Niagara Falls
   Ontario, Canada

5. Professor Elwood W. Kalin
   Department of Horticulture
   Washington State University
   Pullman, Washington

The names of the varieties which were obtained from the above parties are as follows:

Afterglow	Autumn	Brilliancy	Chief
Alice Laithe	Beauty	Blu'mei	C. J. Reardon
Alice Merrill	Beckwith's Gem	Campfire	Christmas Gem
Anna Pfitzer	Big Tim	Candidum	Crimson Velvet
Augusta Raymond	Blackburn	Caroline Beck	Cristata
Daudet Sport	Golden Mottle	Negro	Scarlet Ribbons
Dominant	Green & Purple	Norma Neill	Setting Sun
Doris	Harlequin	N.R.A.	Skylark
Duneria	Hollywood Crimson	Orange Beauty	Schuder
Elwood W. Kalin	Jane Downes	Paisley Shawl	Spotted Gem
Emerald Green	Joyce	Palouse	Sport of Lincoln
Erma Kalin	Kamiaken	Pegasus	Sue Lynn Martin
Ewart	Lang's Croton	Picturatum	Sunbeam
Excellent	Lanceolatus	Pimento	Sunset
Fern Marie	Lanceolatus, Red	Pineapple Beauty	Tapestry
Frances Eickhoff	Leopard	Poynton	Thais Merrill
Frances Kalin	Lloyd Linder	Purdue	Torch

Freckles	Lord Alverson	Queen Victoria	Vershaffel Tic
Freshman	Lord Falmouth	Rainbow	Variegated Turner
Gilbert's Red	Lutea	Red Croton	Vesuvius
Glitter	Madame Caroline	Red Cloud	Washington State
Glory of Autumn	Marjorie Martin	Red Trailing Queen	W.S.U. #1
Gloria Jean	Margaret E. Kalin	Rust	Wilma Sprague
Glory of Luxemburg	Max Levering	Russett	White Gem
Golden Bedder	Mrs. C.H. Harding	Salmon Croton	
Golden Cut Leaf	Mrs. C. Clement French	Sarah Knox	

These Coleus varieties are now being grown in containers in the greenhouse and on beds at our flower varietal trial garden. Each variety will be checked carefully for adaptation to both indoor and outdoor conditions with particular emphasis on color retention, size and form of plant, vigor, appearance, etc.

H. J. Sefick, Associate Professor, Horticulture Department, Clemson University, Clemson, South Carolina.

Pear - Six Tennessee Experiment Station selections and 3 obtained from South Carolina and Georgia have been topworked into'Old Home'rootstock. This variety is being used for border trees around an extensive rootstock and pruning experiment. 'Magness', 'Moonglow' and'Stark's Delicious' budded on 'P. Calleryana' and 'Domestic French' seedlings should reveal differences in rate of growth and resistance to fire blight.

Bunch grape - Four selections, 3 from the Augusta-Camp Gordon area and one from South Carolina, should fruit this year (1964). All appear to be Vitis aestivalis derivatives. The one from Southcarolina, commonly referred to as Stockman grape, produces a small, dark-blue berry, larger than 'Norton's Virginia', but not so acid. All of these selections are very vigorous and healthy-looking vines.

Peach - A yellow clingstone peach completely free of red color at the pit might be suitable for breeding. The canned flesh is not a dark yellow, but greenish-yellow in color. It has been designated 'Palmer Cling', and was obtained from Oconee County, South Carolina.

Mr. R. B. Taylor, Greer Nursery, Greer, South Carolina.

I have been receiving plants from U.S.D.A. from 1926 and have the following trees and plants that are doing fine:

Chinese Chestnut - We have been growing trees from seed for 30 years.

Laurel Leaf Holly (Ilex latifolia) is one of the best hollies and it should be used more in border-planting.

Chinese Frienge - This plant is not being used and promoted as it should. It is good for hedge and background plantings. From the original Chinese holly (Ilex cornuta), we have from seed a dwarf large leaf and large berry. This plant is 48 by 40 inches wide and came up in 1930. It is about 30 to 35 years old. We have a weeping cherry from seed, a cross of Prunus subhirtella and'Sheshine' white single cherry. When in bloom, the buds are deep pink turning to shell pink when open and later to pure white. There are usually 3 colors on the tree at the same time. I named it Bernice Taylor Weeping cherry. We have plants received in 1963 and 1964 that we are testing.

TENNESSEE 1964 ANNUAL PROGRESS REPORT
ON S-9 (NEW PLANTS) PROJECT

W. E. Roever

Two hundred and ninety-one P.I. accessions were received by ten cooperators since the report of July 16, 1963. These included 160 ornamental, 116 agronomic and 15 vegetable accessions.

Twenty-one turnip accessions, tested by E. L. Felix, showed moderate-to-severe Cercosporella leafspot in greenhouse tests, while two other entries, incorrectly labelled _Brassica rapa_, proved highly resistant. These were identified as _Barbarea verna_ (wintercress), P.I. 220166 from Afghanistan and _Rafanus sativus_ (radish), P.I. 249558 from Thailand. This long white radish has tender leaves of collard texture and flavor when cooked. It could possibly prove useful as a source of resistance to Cercosporella leafspot in crosses with turnip since crosses of _Raphanus X Brassica_, specifically _R. sativus_ X _B. oleracea_ (cabbage) have been made. A paper, "Cercosporella leafspot resistant radish greens", is to be presented at the American Phytopath Society meetings at Purdue, August 23-26, 1964. An abstract now in press will appear in Phytopath. 54: 1964.

Dr. L. M. Josephson is testing _Zea mays_ introductions for the following pests:

1. Southwestern corn borer - Ninety-seven were tested and six had low infestations. These were all early maturing. Ninety-seven new introductions are being tested in 1964, and 32 of the most-resistant older ones are being repeated.

2. Corn Smut - P.I. 213731, 213798, 213799 and 218135 had good resistance to smut in both 1962 and 1963. Thirty-six new introductions were tested in 1963. Nos. 213771, 217404, 217488, 186198 and 186226 had the lowest per centage of infected plants and damage grades. Repeat tests are being made on 18 accessions and 97 new introductions are being tested.

3. Corn earworm - Six introductions tested previously and 35 new accessions were tested in 1963. P.I. 217413 continued to show good resistance. None was found in the other lines tested. P.I. 186225 from Australia was previously reported to be resistant. Resistance was found to be due to a very long husk. When the husk is cut off prior to infesting with earworm larvae or in seasons when the husk does not grow long, it becomes susceptible. Ninety-six new introductions are in the 1964 tests.

Dr. George Campbell grew several plants of _Solanum quitoense_ P.I. 152343 and 263169 over a long season in outdoor plots using well-grown plants for setting. They flowered well but failed to set fruit under our conditions of climate and day length.

Most of the cooperation of the Agronomy Department with the Regional S-9 (New Plants) Project has been conducted by J. K. Underwood. He is retiring September 1, 1964. In view of this fact, a full report was submitted this spring.

Outstanding accessions tested during the past two years were:

Agropyron semicostatum P.I. 238223 from Sweden. 2.36 T/A. Capable of producing a seed crop after first cutting.

Agropyron trichophorum P.I. 206259 from Turkey. 2.64 T/A. One cutting possible. No seed crop after the one cutting.

Bouteloua curtipendula P.I. 241045 from Wyoming. 3.37 T/A. Three cuttings. A seed crop after first cutting possible perhaps even after second cuttings.

Bouteloua curtipendula P.I. 216860 from Texas. Although seeded in 1963, and produced on 16 1.24 T/A, it is very possible it will be the equal or better than P.I. 241045 in 1964. It is darker green and purplish. The gramagrasses should be introduced to our eastern cattle for palatability tests. Their only advantage, but a great one over Bermudagrass, is its non-pest character.

Lolium multiflorum P.I. 251826 from Austria. 4.24 T/A in 3 cuttings. See note on seed harvesting.

Panicum antidotale P.I. 185457 from India; 253716 from India; 268410 from Afghanistan and 269943 from West Pakistan all show promise in selection for winter hardiness.

Panicum maximum P.I. 259561 from Uganda. 9 T/A shows promise from a volunteering basis since it is not winter hardy.

Pennisetum ciliare P.I. 253725 from Australia. 5.64 T/A. It will be interesting if this number has any winter hardiness.

Phalaris arundinaceum P.I. 237724 from Germany. 5.2 T/A. Perhaps this species' lack of palatability could be overcome with a general use of molasses in green chop or hay chop.

Phleum pratense P.I. 205445, from Japan. 1.94 T/A. The best of the Phleums tested.

ANNUAL REPORT ON NEW CROPS RESEARCH IN TEXAS

Eli L. Whiteley

The 1963-64 crop year was about normal. A mild fall was favorable to the establishment of crops planted in the fall. July, August and September, 1963 were fairly dry and reduced yields of pulp crop plantings. The winter months were cold and all plantings except fennel (Foeniculum vulgare, P.I. 268383) were killed.

A total of 1698 accessions were received by researchers, individuals and commercial concerns during the 1963-64 crop year. Many of these accessions could not be evaluated before the meeting date of the S-9 Technical Committee. These materials will be included in next year's report.

Crops for Industrial Uses

Oilseed Crops

Crambe abyssinica (P.I. 247310) was released to 9 farmers under a memorandum of agreement in 1963-64. All of the plantings made in the fall were killed by cold weather in January and early February. Several of these plantings were made in 40-inch rows and yields ranged from about 600 to 1000 pounds per acre. Yields of the broadcast plantings by farmers have not been reported at this date.

Crambe plantings at College Station made prior to February, 1964, were killed by cold weather. About 50 lines were replanted February 20, 1964 for evaluation. Very poor stands were obtained and no yields were taken. Broadcast plantings produced 1000 pounds of seed per acre in a 1/10-acre plot.

Seed of Crambe were irradiated at seven levels: 2,000r; 4,000r; 8,000r; 16,000r; 32,000r; 45,600r; and 68,400r. Germination of the treated seed was very poor and all of the plants died. These irradiation treatments were started in an effort to find some cold resistance in Crambe. However, it is possible that some changes in the oil content and composition and changes in the meal composition could occur as a result of irradiation.

A planting of Crambe was made on Substation No. 1 at Beeville, Texas. Aphids destroyed many of these plants and yields are not available at this time.

Two plantings of Crambe were hand sown and drilled (with an 8" grain drill) at Weslaco, Texas on October 27 and October 30 respectively. A seeding rate of 12 pounds per acre was used. The plants grew vigorously to indicate the feasibility of high-density plantings. It was obvious, however, that this seeding rate was excessively high and a reduction of 8 pounds per acre would no doubt be adequate. These plantings were in bloom in early January and were destroyed by the low temperatures.

Crambe planted on a double-row vegetable bed on November 2 survived the January freeze, but was badly damaged. Some 9 individual plant selections were made for cold tolerance before the planting was harvested. These selections were planted in progeny rows in October, 1963.

Lesquerella gracilis and L. grandiflora were planted twice and both plantings were failures. A study was designed to test the effect of pH on the germination of Lesquerella seed. The results are given in the table below.

pH of Soil	% Germination	pH of Soil	% Germination	pH of Soil	% Germination
5.8	24	7.0	20	8.1	44
6.1	24	7.4	16	7.9	20
6.0	8	7.5	44	7.9	48
6.2	28	7.7	44	7.9	36
6.7	28	8.0	16	7.9	52
6.8	48	8.0	28	7.9	32
7.2	52	8.1	40	7.9	32

No consistent pattern developed from this study.

Vernonia anthelmintica (NV40159) planted on April 30, 1964, has developed fairly well and will be used in a harvesting test. Plantings made on May 15 and June 1, 1964 failed to germinate to a stand and were replanted on June 10, 1964. This planting emerged to a poor stand but will be maintained in an effort to increase seed of this plant.

A small planting of Vernonia was made at Substation No. 1 at Beeville, Texas. This was made rather late in the season and may not yield much information about yields in the Beeville area; however, we should learn something about the growth and development of the plant in this area.

An analysis of the seed grown in Texas in 1963 was made by the Eastern Utilization Research and Development Division, A.R.S., U.S.D.A., and is presented in the table below:

VERNONIA SEED ANALYSIS - Texas, 1963

		Seed		Oil Composition		
Sample Number	Characteristic	% Moisture	% Oil (MFB)	% Epoxy Oxygen	% Free Fatty Acids	% Saponifiables
1	1st Harvest	5.50	22.3	2.43	4.97	79.6
2	2nd Harvest	5.24	22.3	2.80	4.71	90.2
3	Selection	4.43	21.0	2.86	2.81	91.6

Relative to the levels of constituents considered to be of good quality, all three samples were low in oil (moisture free basis) and Epoxy oxygen content. Samples 1 and 2 were higher in free fatty acids than desirable. Sample 1 was quite low in % saponifiables.

Denton, Texas
D.I. Dudley

Plants:
Kenaf - 'Everglades 71'
Crotalaria juncea (P.I. 248491)
Crotalaria juncea - 'Texas 374'

Replications:
Three

Plot Size:
25 feet long and 8 rows wide

Row Spacing:
14 inches
20 inches

Cultivation:
Cultivated
Not cultivated

College Station, Texas
Eli L. Whiteley

Plants:
Kenaf - 'Everglades 41'
Kenaf - 'Everglades 71'
Crotalaria juncea (P.I. 248491)
Crotalaria juncea - 'Texas 374'

Row Spacing:
20 inches

Replications:
Three

Plot Size:
25 feet long and 8 rows wide

Supplemental water:
Irrigated

Results from the above tests will be available in next year's report. Yields of the plants included in the 1963 Regional Pulp Test were low due to low rainfall. The yields in pounds of oven-dry material per acre are given in the table below:

REGIONAL PULP TEST 1963
COLLEGE STATION, TEXAS

Plant & No.	Rep. No.	Yield in Pounds Per Acre	Average Height (Feet)	Avg. Stem Diameter (m.m.)	No. Plants Per Foot of Row	% Moisture
C. juncea 'Texas 374'	1	2773			6	
	2	7390			6	
	3	6932			4	
	4	6462			7	
	Average	5889	8	13	5.75	29.4%
Okra	1	1308			5	
	2	1635			4	
	3	2616			4	
	4	3270			2	
	Average	2207	4	19	3.75	50.0%

Seed of Vernonia were irradiated at seven levels: 2,000r; 4,000r; 8,000r; 16,000r; 32,000r; 45,600r; and 68,400r. Germination of the treated seed was very poor and very few plants emerged. These plants are growing very slowly at the present time. It will be next year before any results will be available from this test.

Fennel (Foeniculum vulgare, P.I. 268383) was planted on three dates - October 15, 1963; February 15, 1964 and March 15, 1964. The October 15, 1963 and March 15, 1964 plantings emerged to poor stands. The February 15, 1964 planting emerged to a fair stand. The October 15, 1963 planting was killed back to the crown by very cold weather in January, 1964; but these plants resumed growth as soon as the weather warmed up in late February. The plants made good growth and flowered the first week in May. These plants will be ready for harvest about the middle of July. The yield of seed is expected to be quite low due to the poor stand obtained in this planting. The stubble will be left in the field to see if the plants behave as a true perennial. Some shattering of seed occurred; therefore, a good stand of plants should be obtained in the area next year.

RAPE

Two small observation plantings of rape, varieties 'Regina' and 'Golden' were planted on November 2, 1962. Vigorous growth was indicative of excellent adaptation in the Lower Rio Grande Valley. The variety, 'Golden', was the most productive; the seed were harvested with a commercial combine. Heavy aphid infestations, requiring chemical control measures, were the only adverse production factors noted.

Crops for Paper Pulp

Crotalaria juncea (Texas 374) was released by the Texas Agricultural Experiment Station in April, 1964. This variety was developed by W. R. Cowley at Weslaco, Texas. It has produced high yields during the four years it has been tested at College Station. Foundation seed was produced in 1963 and seed will be available to farmers in 1965.

Seed of 'Texas 374' was released under a memorandum of agreement to Champion Papers, Inc., and Kimberly Calrk Corporation for plantings by these companies on their own land in Texas and Alabama, respectively.

About 200 lines of C. juncea were planted at College Station for further testing for yield and alkaloid content. These lines include 44 white-seeded lines isolated by W. R. Cowley at Weslaco, Texas.

Seed of low alkaloid lines were increased in the 1962 fall-winter season at Weslaco. No work was conducted with these lines in the 1963 growing season; further increase and reselection during 1964 are planned.

Research was conducted in attempts to isolate a pure line of white-seeded Crotalaria juncea. A single-plant, white-seeded selection was made from 'Texas Line 263' in 1961. Some 116 plants from this selection were grown under isolation in 1962; 19 white-seeded plants occurred in this population; each plant was harvested separately and the seed were progeny rowed in 1963. The occurrence of white-seeded plants is shown in the following table:

Plant Number	Total Number Plants	Number White Seeded Plants	% White Seeders
1	292	164	55.78
2	535	213	39.81
3	935	394	42.14
4	538	256	47.58
5	947	334	35.27
6	846	330	39.01
7	968	328	33.84
8	436	185	42.43
9	1234	315	25.53
10	560	159	28.39
11	301	129	42.86
12	215	94	43.72
13	512	162	31.64
14	337	198	58.75
15	91	43	47.25
16	124	60	48.39
17	99	34	34.34
18	341	149	43.70
19	292	123	42.12
Total	9605	3670	38.21

Selection of white-seeded plants was made throughout the range of phenotypes in eacy progeny row. The remainder of the seed within progeny rows were massed. Studies will be continued in 1964 toward the genetic determination of this seed color character.

Regional Pulp Test - The regional pulp test was planted at three locations in Texas: Lubbock, Denton and College Station. These plantings include the treatments as outlined below:

Lubbock, Texas
Mr. J.S. Newman

<u>Plants</u>:
Kenaf - 'Everglades 71'
Crotalaria juncea (P.I. 248491)
Crotalaria juncea - 'Texas 374'

<u>Replications</u>:
Three

<u>Plot Size</u>:
25 feet long and 6 rows wide

<u>Row Spacing</u>:
14 inches
20 inches

<u>Supplementary Waters</u>:
Irrigated
Non-irrigated

<u>Cultivation</u>:
Cultivated
Not cultivated

Plant & No.	Rep. No.	Yield in Pounds Per Acre	Average Height (Feet)	Avg. Stem Diameter (m.m.)	No. Plants Per Foot of Row	% Moist-ure
Sesbania arabica 167069	1	2014			4	
	2	2446			7	
	3	4094			5	
	4	4094			5	
	Average	3162	8	9	5.02	37.5%
C. juncea Brazilian strain	1	6108			9	
	2	5088			5	
	3	8149			5	
	4	8659			4	
	Average	7001	10	15	5.75	22.2%
Kenaf 'Everglades 71'	1	7364			6	
	2	8175			6	
	3	6959			9	
	4	3270			8	
	Average	6442	9	21	7.25	37.5%
Sesbania annabinis 180050	1	3139			3	
	2	3531			4	
	3	6278			5	
	4	3139			5	
	Average	4021	9	11	4.25	40.0%
Kenaf 'Everglades 41'	1	6867			7	
	2	7848			5	
	3	8829			8	
	4	11772			9	
	Average	8829	10	19	7.25	25.0%

SUPPLEMENTAL PULP TESTS 1963
COLLEGE STATION, TEXAS

Plant & No.	Rep. No.	Yield in Pounds Per Acre	Average Height (Feet)	Avg. Stem Diameter (m.m.)	No. Plants Per Foot of Row	% Moisture
Kenaf	1	5611				
'Everglades 71'	2	7207				
	3	5611				
	4	7207				
	Average	6409	9	19	-	38.8%
Kenaf	1	6278				
'Everglades 41'	2	6278				
	3	7063				
	4	8633				
	Average	7063	10	21	-	40.0%
Crotalaria juncea	1	8515				
Brazilian strain	2	7573				
	3	5677				
	4	6632				
	Average	7099	10	13	-	27.7%
Crotalaria juncea	1	7861				
	2	7861				
	3	6108				
	4	6108				
	Average	6984	9	14	-	33.3%

The results of the Sorghum Pulp Test are presented in the table below. The yields of these plants were low due to dry weather.

Sorghum Pulp Test 1963
College Station, Texas

			Tons Per Acre			
Entry	Crop	P.I. No.	Stalks	Heads	Leaves	Total
1	Sorghum vulgare	229847	2.05	.00	2.31	4.36
2	Sorghum almum	190579	2.06	.94	1.47	4.37
3	Sorghum almum	202410	3.21	1.11	2.47	6.79
4	Tift Sudan	FC 36204	2.22	.99	1.20	4.41
5	Durra	179749	1.49	.73	1.26	3.48
6	Kaoliang	88000	1.26	.88	1.55	3.69
7	Sorghum vulgare	229837	2.45	.55	2.31	5.31
8	Kaoliang	88004	2.59	.81	2.21	5.61
9	Broom Corn	177549	2.59	.81	2.21	5.61

The evaluation of the above sorghums for pulp was made by the Northern Utilization Research Development Division in Peoria, Illinois. The results of the evaluation are given in the following table.

1963 SORGHUMS FOR PULP - NURDD EVALUATION OF TEXAS (COLLEGE STATION) SAMPLES

Identifying Number	Composition			Composition (No Heads)		Stalk Diameter	Ash		Wax		Sol in 1% NaOh	
	Heads %	Leaves %	Culms %	Leaves %	Culms %	(in.)	Leaves %	Culms %	Leaves %	Culms %	Leaves %	Culms %
88000	24.2	45.5	30.3	60.2	39.8	1/8-3/8	11.7	3.2	3.1	0.9	52.2	53.4
88004	34.9	35.5	29.7	54.6	45.4	1/8-5/8	11.4	3.2	3.1	0.9	56.8	49.6
177549	14.8	41.9	43.3	49.3	50.7	1/4-5/8	8.4	2.8	3.4	1.5	51.6	51.5
179749	27.2	36.1	36.7	49.6	50.4	3/16-1/4	11.4	3.1	2.7	0.8	53.8	48.2
190579	21.3	36.6	42.1	46.5	53.5	1/8-3/8	7.2	2.4	3.0	1.0	54.8	46.4
202410	16.6	40.7	42.7	48.8	51.2	1/8-1/2	7.3	2.4	2.4	0.8	51.6	46.3
229837	6.6	42.8	50.6	45.8	54.2	1/8-1/2	8.4	2.0	3.2	1.4	53.0	58.4
229847	-	61.0	39.0	61.0	39.0	1/4-3/4	6.9	3.1	3.8	1.1	57.4	57.2
FC 36204	23.0	32.4	44.6	42.0	58.0	1/16-1/4	9.0	3.1	3.6	0.8	56.3	54.9

Identifying Number	Sol. in Alcohol Benzene		MEA Cellulose		Cellulose*		Rind by Weight	Apparent Pith by Volume	Pith by Weight	Vascular Fiber by Weight
	Leaves	Culms	Leaves	Culms	Leaves	Culms				
88000	9.4	16.0	41.4	40.5	24.0	24.2	67.0	68.2	12.1	20.9
88004	9.4	8.3	37.1	45.5	22.6	28.3	66.0	71.9	12.0	22.0
177549	11.8	8.5	43.7	44.3	26.8	26.3	69.6	74.5	13.4	17.0
179749	16.2	22.6	39.5	43.7	22.4	26.4	66.0	66.0	10.3	23.7
190579	14.5	16.0	38.7	47.2	24.2	29.3	77.2	61.6	7.2	15.6
202410	12.8	15.8	44.1	50.3	26.9	30.2	72.6	67.4	9.7	17.7
229837	11.8	17.1	39.8	35.1	24.2	21.7	73.8	65.7	11.8	14.4
229847	16.0	17.0	34.6	36.8	21.3	22.2	76.0	61.1	8.8	15.2
FC 36204	10.7	13.5	37.7	39.6	23.9	24.7	77.6	51.9	6.7	15.7

* On original basis.

Foundation seed of 'Texas 374' were irradiated at seven levels: 2,000r; 4,000r; 8,000r; 16,000r; 32,000r; 45,600r; and 68,400r. These seed were planted at College Station and Weslaco. The planting at College Station was destroyed by rabbits. No effects on germination of the seed were noted at either location. No visible deformations of the young plants have been noted in the planting at Weslaco.

Crops for Gum

Cassia occidentalis (279694) - This plant was grown in 40-inch rows in 1963. A poor stand was obtained in the test last year and a large amount of shattering occurred due to the late harvest (January, 1964). The 1964 planting was made with a grain drill and looks good at this time. In the Regional Guar Tests last year, Cassia produced more per acre than guar. Cassia has about 54% endosperm, while guar has about 39% endosperm in the seed.

Two accessions of Cassia occidentalis from the Virgin Islands were planted this spring (P.I. 292843 and 292844). These plants are growing rather slowly at this time. Seed of these two accessions will be increased for further testing.

Sugar Crops - Sweet Sorghum and Sugarbeets

In cooperation with Crops Research Division of ARS, trials have been conducted since 1961, with breeding lines of sweet sorghums under development by federal breeders. One line, evaluated as Mer. 55-1, has been outstanding in all tests for yield, purity and sucrose content; equivalent yields to 2 tons of sugar per acre have been obtained. Purity of above 75% has been generally noted. Results of these trials are reported in detail in ARS publication 34-59 of September, 1963. Further processing studies are pending.

Sugarbeet plantings have been made each month since July. The first harvests for evaluation of sucrose and purity are scheduled for December.

Should production and processing trials indicate the potential for sugar production, a combination of these two crop enterprises would provide an extended season for the milling in the south Texas area.

Field Crops

Castorbeans (Ricinus communis) - Dr. R. D. Brigham reports that an indehiscent S-pistillate selection designated TSP 10 R has been made available to castorbean breeders this year. This line carries the dwarf-internode character originally derived from P.I. 246332, commonly designated as IA-38.

Sesame (Sesamum indicum) - Dr. G. W. Rivers grew 128 Sesamum indicum introductions in 1963. Although treated with streptomycin to eliminate seedborne Pseudamonas sesami (the causal organism of bacterial leaf spot), the plants were heavily infested with this organism in 1963. These seed were retreated with streptomycin and are being reincreased in isolation this year.

Seed of several accessions are being increased this year, including P.I. 278162 and 278166, supposedly Sesamum radiatum; P.I. 297545, 292026, 292027 and 292028, Sesamum indicum.

Among the 128 S. indicum accessions grown in Texas in 1963, a number appeared promising for one characteristic or others and may eventually be used in the sesame breeding program at College Station.

Ornamental Plants

Link Floral Co. of Weslaco, Texas reports that Begonia (P.I.'s 292728-35) grow well in that area. They were reported as susceptible to nematodes and damping off. However, they were reported as a great improvement over the other plants that they have available for flowering and compactness. They plan to propagate the begonias and introduce them to the retail trade. Other plants received by Link Floral Company which show some promise are: Clerodendron sp. (P.I. 258370); Lilium nepalense (P.I. 287186); Liriope spicata (P.I. 285374 and 285375); Oroxylum indicum (P.I. 287188); and Oxytenanthera abyssinica (279656).

Verhalen Nursery Company of Scottsville, Texas reports on the following plants: Oxytenanthera abyssinica (P.I. 279656) - These plants are 24-36 inches in height and look good. Cotoneaster frigida (P.I. 285390) is 3-5 feet in height and is very vigorous. Cotoneaster microphylla (P.I. 285323) has an attractive green foliage on a bushy plant and grows well in a container. Damnacanthus indicus (P.I. 275494) is reported as a dark green compact dwarf plant with thorny foliage that looks good. Ilex crenata variety 'radicans' (P.I. 276162) has a deep green foliage with a light streak down the midrib of the leaf and shows some promise.

Lowery Nursery in Houston, Texas rates the Belgian Glenn Dale Azaleas in the following order:

1. P.I. 279406 'Green Mist' - Best growth
2. P.I. 279407 'Petite' - Very attractive
3. P.I. 279408 'Pink Ice' - Good
4. P.I. 279405 'Bayou'
5. P.I. 279409 'Whitehouse'

The Osmanthus sp. (P.I.'s 242288, 236241, 242291, 231949, 242292, 238030) are growing very well. Raphiolepis umbellata (P.I. 277653 and 277664) both show good vigor and heat tolerance. Ilex paraguariensis (P.I. 279952) is growing well.

Horticultural Plants

Dr. H. T. Blackhurst and Mr. Mack C. Fuqua reported on the following accessions:

Lycopersicon esculentum (P.I. 213189) - This tomato is being used in a breeding program. The plant has short internodes, small firm fruit, and is exceedingly prolific over a long period of time for a determinate type.

Lycopersicon esculentum (P.I. 262934) - This tomato is being used in a greenhouse tomato breeding program in an effort to transfer the short internode character to a greenhouse variety.

Phaseolus vulgaris accessions are still being evaluated.

Solanum accessions are being used to determine the crossing relationships and linkage groups in eggplants.

Allium sativum - All accessions were dead when received.

Dr. E. T. Graham reports that Rubus (P.I.'s 247797, 247797-A and247797-B) plants have been transplanted to the field. Seed of Rubus, Fragaria glauca (P.I.'s 236853 and 236853-S) and F. chiloensis (P.I.'s 264680, 278847 and 278848) will be germinated in the greenhouse this winter and transplanted to the field in the spring of 1965. The above materials will be evaluated for characteristics which might be useful in hybridization work.

Dr. A. L. Harrison grew the following tomato accessions to check their ability to set fruit under high temperatures:

95588	255840	262929
223312	255847	262934
234625	255855	264336
237132	262159	280060
237137	262908	285068
255829	262910	285133
255830		

None of these lines were as satisfactory as some of the existing breeding lines in their ability to set fruit under high temperatures. Many of the lines failed to set even a single fruit. Accessions 255847, 255855 and 262159 set some fruit, but most of the fruits were seedless.

Peanuts - The following peanut introductions were planted and rated for resistance to Cercospora leaf spot by Dr. Harrison at Yookum, Texas:

P.I. Number	Leaf Spot Index	No. Samples Saved
121067	2	0
145046	2	1
149272	2	1
149636	3+	0
152144	4+	1
158023	4+	0
162539	2	0
194246	2-	1
196602	2-	1
196603	2-	1
196604	1+	1
196621	1+	1
196623	1+	1
196625	1+	2
196626	1+	0
196627	1+	2
196628	1+	1
196640	2	0

Continued

P.I. Number	Leaf Spot Index	No. Samples Saved
196647	2	1
196649	3	0
196652	3	1
196653 (No plants)	-	-
196654	2	0
196655 (No plants)	2	-
196656 (One plant)	2	0
196657	2	0
196658	2	0
196660	2	0
196666	1+	2
196673	1+	2
196674	2	0
196675	1+	1
196676	1+	0
196677	1+	0
196684	1+	0
196695	1+	0
196696 (No plants)	-	-
196713	1+	1
196714	1+	1
196716	1+	0
196730 (No plants)	-	-
196731	1+	0
196732	1+	0
196768	2	0
196769	2	0
196832	2	0
197399(No plants)	-	-
2004	2+	1
200432	2	0
200433	4	0
20044	3+	0
203395	2-	0
203396	2	0
203397	1+	0
244606-1	1+	0
244606-2	1+	0

Roling Scale:

1 - No Spotting
2 - Occasional spot
3 - Intermediate
4 - General spotting
5 - Nearly defoliated

Several of these lines have resistance to Cercospora leaf spot; these lines will be checked this year and selections made for breeding lines.

Okra - Breeding and Testing

In the 1963 season, 65 P.I.'s and P.I. selections were rescreened for characters of special value to the breeding program, such as earliness, dwarfness, low spines, strap leaf, pod quality and fruiting rhythm.

A very wide range of plant types and fruit characteristics were evaluated from crosses among P.I.'s and from crosses of P.I.'s into standard varieties. Selections of excellent potential were made from some 106 lines resulting from crosses of standard varieties that were outcrossed in early generations to P.I. selections. Some lines of 249620X Perkins were mass-selected for further studies in 1964.

The progress to date with the okra breeding program at Weslaco indicated that germ plasm from P.I's will be a major contribution toward the development of vastly superior strains for production in south Texas.

Forage Plants

Mr. M. F. Schuster reports that three _Chloris gayana_ accessions show some promise at Weslaco. These plant introductions (P.I. 205251, 263506 and 205250) were little affected by Rhodesgrass scale. These accessions will be reselected and incorporated into the breeding program toward Rhodesgrass scale-resistant varieties.

Dr. J. Neal Pratt made preliminary evaluations of the following accessions at Weslaco:

Botanical Name	P.I. Number	Potential Use
Cynodon dactylon	290660	Lawn
	290661	Lawn
C. transvaalensis	290812	Lawn
	290892	Lawn
	224151	Lawn
	289917	Lawn
	289918	Lawn
C. dactylon	291583	Lawn
C. magenissii	291589	Golf turf
C. dactylon	291586	Lawn
	291577	Permanent pasture
	291587	Lawn
	290868	Lawn
	255442	Permanent pasture
	255453	Permanent pasture
C. magenissii	291590	Turf
C. transvaalensis	291591	Turf
C. dactylon	291581	Turf
	291580	Turf
	291614	Permanent pasture
	291585	Lawn
C. transvaalensis	286584	Turf

Dr. W. G. McCully reports that he failed to get stands of *Melica sp.* (P.I. 206700 and 230262). Seed of these plants will be planted in the greenhouse this fall.

Mr. Dennis Anderson, Department of Botany, University of Texas, Austin, Texas received a number of *Chloris* species. These plants will be used in cylotological and taxonomic studies of this genus.

Sorghum

Mr. Minter Womack of Corn States Hybrid Servic, Inc. reported on two *Sorghum vulgare* accessions. P.I. 180008 was reported as a red restorer of good combine height and good combining quality. These plants segregated into awned and awnless plants. The awned type was selected and tested for yield; a considerable loss in yield occurred in this selection. P.I. 236258 was reported as an awnless plant that could be sterilized and used as a seed parent. This plant showed many fertile plants; therefore, another attempt must be made to find a completely sterile plant in this material.

Work Planned for Next Year

Work with *Crambe* will be continued along the same lines pursued this year. Efforts will be concentrated on finding cold resistance in this material. Irradiated seed will be planted in the greenhouse to see if some plants can be grown from these seed.

A number of lines of *Vernonia* have been selected this year. These lines will be tested next year.

Crotalaria juncea lines will be tested again next year. If the results of the tests are good, seed of line 214 will probably be ready to increase for wider testing. A test on the effect of *C. juncea* on cotton root rot will be continued on the Stiles Farm Foundation at Thrall, Texas.

Evaluation of plant introductions of other potential crops, such as *Crotalaria* species for gum, Kenaf and *Sorghum* for pulp and *Dimorphotheca* and fennel fcr oil will be continued.

Introductions of field crops will be evaluated by those workers working with these crops.

Plants Released

'Texas 374' (*Crotalaria juncea*)
Abon Persian clover
Summer Cherry Tomato
Castorbean - Line TSPIOR
Valmaine Lettuce

Publications

Whiteley, Eli L. and Calvin A. Rinn. A New Crop Promises Additional Revenue in the Southwest. Grain Age. Vol. 4 No. 12. p. 32. December, 1963.

Cowley, W. R. and Eli L. Whiteley. 'Texas 374' - A New Summer Legume for Soil Improvement and for Possible Industrial Use. L-619. Texas Agr. Expt. Sta. April, 1964.

Young, P. A. Summer Cherry - A Spring, Summer and Fall Cherry-type Tomato for East Texas. L-609. Texas Agr. Expt. Sta. September, 1963.

Weihing, Ralph M. Abon Persian Clover. L-618. Texas Agr. Expt. Sta. April, 1964.

Anonymous. Valmaine - A New Downy-mildew-immune Romaine Lettuce Variety. L-610. Texas Agr. Expt. Sta. November, 1963.

Weihing, Ralph M. Registration of Gulf Annual Ryegrass. Crop Sciences 3:366, 1963.

Weihing, Ralph M. Selecting Persian Clover for Hard Seed. Crop Sciences 2:381-382. 1962.

REGIONAL STATION REPORT

W. R. Langford
and
Grover Sowell, Jr.

A. Receipt of new plant materials. During the year ending June 30, 1964, more than 2000 new accessions were added to the collection of seedstocks maintained at the Regional Station (Table 1). Seventy-eight genera are represented by the new introductions, but three grass genera (*Cynodon*, *Digitaria* and *Bothriochloa*) constitute more than one-third of the material. The Regional Station received 285 accessions of *Cynodon* collected last year by Dr. Wayne Huffine of Oklahoma State University. One-hundred-ninety-eight accessions of *Digitaria* collected in Africa this year by Dr. A. J. Oakes were received during June. The other large grass collection was *Bothriochloa* collected and maintained by Dr. Jack Harlan at Oklahoma State University. More than 100 accessions each of *Arachis*, *Sorghum*, *Trifolium* and *Vigna* were received.

Table 1. New materials received July 1, 1963 - June 30, 1964.

Crop group	Number of accessions: On hand	New	Total
Field crops	5697	452	6149
Forage grasses	1520	998	2518
Forage legumes	1201	226	1427
Horticultural	4040	348	4388
Miscellaneous	28	82	110
Total	12486	2106	14592

B. Distribution of seeds and plants. The Regional Station distributed 10,626 packets of seed or vegetative stocks last year. Research workers in the South received 7151 lots, and 2333 packets were sent to plant scientists in other regions. Seed of 406 introductions were placed in the National Seed Storage Laboratory. Seven-hundred-thirty-six packets of seed were sent to Beltsville for shipment outside the United States.

Table 2. Distribution of seeds and plants during the year ending June 30, 1964.

Crop group	Number of seed packets or plants sent to: S-9	NE-9	NC-7	W-6	NSSL	For.	Total
Field crops	2597	6	375	73	297	115	3463
Forage grasses	1577	6	4	312	---	222	2121
Forage legumes	473	55	58	83	---	106	775
Horticultural	2407	185	218	958	109	293	4170
Miscellaneous	97	---	---	---	---	---	97
Total	7151	252	655	1426	406	736	10626

In addition to the material distributed from Experiment, research workers in the South also obtained 3749 packets of seeds or plants from other regional and federal stations. The station at Glenn Dale supplied 2330 items, most of which were ornamental or fruit plants.

C. Preliminary evaluation. Thirty-seven-hundred-thirty-four accessions were planted this year for seed increase. Nearly 800 of these were winter annual legumes planted last fall and harvested this spring. Among the new materials under preliminary evaluation this summer are thirteen accessions recommended by the Utilization Research and Development Division as having potential value for pulp, gum or oil. With the exception of *Trichosanthes cucumerina*, *Desmodium sp.* and *Cassia javanica*, which were low in viability, good stands were established. *Crotalaria eriocarpa* is beginning to show symptoms of a virus infection. Seed have been harvested from two of the *Brassica* accessions. All three *Brassica* accessions bloomed profusely, but set few seed. None of the other species in this collection have flowered.

D. Financial statement. The financial statement for the Regional Station during the 1963-64 and 1964-65 fiscal years is shown in Table 3.

Table 3. Financial statement of Southern Regional Plant Introduction Station 1963-64 and 1964-65

Source of Funds	Amount 1963-64	Amount 1964-65
Regional Research Funds		
Pooled	$ 30,000.00	$ 30,000.00
Allocated to Georgia	6,000.00	6,000.00
State appropriations (Georgia)	1,380.00	4,100.00
ARS (New Crops Res. Br. CRD)	22,965.00	25,290.00
Total	$ 60,345.00	$ 65,390.00

Expenditures	Amount 1963-64	Amount 1964-65 (Proposed)
Salaries	$ 47,490.00	$ 46,815.00
Seasonal labor	5,824.00	5,275.00
Travel		
Coordination of S-9 activities	606.79	900.00
Collection of fruit stocks	191.13	200.00
Capital Outlay	1,726.13	1,700.00
Supplies and operating costs	4,151.40	4,000.00
Contributing Project (Ga. H-172)	---------	6,500.00
Total	$ 59,989.45	$ 65,390.00

E. Major improvements of Regional Station facilities include:

1. Dehumidifier for seed storage room.
2. Installation of cooling equipment in the greenhouse.
3. Purchase of a Fan-Dial scale.
4. Sectional card file.

F. Screening Introductions for Resistance.

1. Resistance of cantaloupe to gummy stem blight. Replicated tests to evaluate eighteen introductions which were resistant in preliminary screening tests were not successful because of an epidemic of powdery mildew and other limiting factors. Field testing of the most promising introductions was delayed until the replicated greenhouse tests are completed.

2. Resistance of southern pea to cowpea chlorotic mottle virus (CCMV). In cooperation with Dr. C. W. Kuhn and Dr. B. B. Brantley of the Georgia AES, the 373 introductions of *Vigna* spp., primarily *Vigna sinensis*, maintained by the Regional Station were screened for resistance to CCMV. Eight of these were highly resistant in five tests. The virus was recovered from inoculated primary leaves on several of these, but it could not be recovered from uninoculated leaves or from inoculated true leaves.

3. Resistance of southern pea to cucumber mosaic virus (CMV). In cooperation with Kuhn and Brantley, the Regional Station collection and a few commercial varieties of *Vigna* spp. were screened for resistance to CMV. Six showed less than 20% infection in the preliminary screening tests. A replicated test is now in progress to determine which introductions have the highest levels of resistance.

4. Resistance of watermelon to race 2 anthracnose. 'Charleston Gray' and other anthracnose-resistant varieties are not resistant to race 2 anthracnose. Watermelon breeders have been seeking a source of resistance to this race without success except for a citron W-695, of doubtful value. W-695, or the 144 introductions which we screened recently in preliminary tests, were not resistant. The presence of a number of pathogenic races complicates disease screening since resistance to each race must be found. The germplasm in storage at the Regional Station can be of tremendous value as new races of pathogens develop in the future.

5. Resistance of tomato introductions to root-knot nematode. Scions of the variety 'Marion' were grafted to stocks of a number of *Lycopersicon* introductions which have been reported as resistant to root-knot nematodes. The grafted plants and ungrafted plants of the introductions and the varieties 'Nemared' and 'Marion' were planted in soil heavily infested by the cotton root-knot nematode, *Meloidogyne incognita acrita* Chitwood. The introductions and 'Nemared' proved highly resistant to this nematode (Table 4). The purpose of this experiment was to establish the resistance of tomato introductions to the specific nematode most common in our plots. This was necessary since there are at least four species of root-knot nematode in the region.

Table 4. Resistance of tomato introductions to the cotton root-knot nematode, Meloidgyne incognita acrita Chitwood.

Variety or P.I. Number	Total Number Plants	Mean Rating 1/
126928	3	0.00
126929	1	0.33
126944	3	0.33
128657	2	0.00
'Nemared'	4	0.00
'Marion'	4	4.00

1/ Rated on 1 - 5 scale.

G. Field Notes on Resistance of Introductions. Disease severity and distribution over the nursery was such that no significant field evaluations of disease resistance were obtained.

H. Identification of Diseases Present on Plant Introductions.

1. Anthracnose of Indigofera sp., caused by Colletotrichum damatium (Pers. ex. Fr.) Grove. This fungus is not new to the United States but the isolates from Indigofera may represent a form distinct in its pathogenicity. All of the plants were killed before they produced seed.

2. A virus, apparently identical to the virus described by Kuhn (1) as causing a leaf mottling of peanuts, was isolated from 100% of the plants of Cassia occidentalis tested. The symptoms on Cassia occidentalis were a mild mottling of the young leaves. On Cassia leptocarpa P.I. 279693, however, a severe tip-necrosis was noted in association with this virus. Cassia leptocarpa plants grown in the greenhouse did not show disease symptoms, indicating that the virus is not seed-borne. Following inoculation of the plants with the peanut virus, a small per centage showed a tip-necrosis similar to that in the field. This disease may be a serious limiting factor in the potentiality of this species as a new crop. Dr. Kuhn also isolated the peanut virus from Cassia occidentalis. Greenhouse tests indicate that the virus is not seed-born in this species. The symptom was a mild mottle or mosaic of the younger leaves. The effect of the virus on yield is not known.

3. A white bacterium, apparently a Pseudomonas sp. was isolated from seedlings of several introductions growing in the greenhouse. It was pathogenic. The new bacterial disease reported by Dr. N. C. Schenck of Florida as the most prevalent watermelon disease in South Florida bears a striking resemblance to the disease of plant introductions.

4. The previously unidentified blight present on a number of introductions of Capsicum in 1962 and a few in 1963 is apparently typical of the reaction

of C. frutescens to tobacco etch virus (TEV). This disease is so severe that 100% of the plants of some introductions were killed. It may be necessary to grow some introductions of C. frutescens in the greenhouse in an environment free of TEV.

I. Production of Pathogen-Clean Seed from Infected Stocks.

1. Vigna spp.: Greenhouse screening tests for resistance to viruses have indicated that viruses have been reduced to a very low per centage of seed transmission by the rogueing and systemic insecticide technique employed in 1963. The remaining virus or viruses are apparently those already established in the United States, primarily cucumber mosaic virus.

2. Cyamopsis spp.: All new guar introductions are again being increased under conditions less favorable for disease development than at Experiment, by Dr. R. S. Matlock.

3. Sesamum spp.: Is being increased in Texas where conditions are less favorable for Alternaria and Pseudomonas leafspots, both of which pathogens are seed-borne.

4. Solanum melongena: Following the development of a severe epidemic of Phomopsis blight of eggplant and the resulting production of low-quality, contaminated seed in 1963, a schedule of applications of a foliage fungicide was followed in 1964.

New disease control practices were also initiated in other crops to assure the maximum production of seed carrying a minimum of pathogenic organisms.

J. Basic Research on Diseases of Plant Introductions.

The gummy-stem-blight fungus. Variation of the pathogen in nature is very poorly understood. A number of isolates of the pathogen have been obtained from Georgia and Florida to compare the new isolates with isolate CSI from South Carolina now in use. This research is necessary to determine the practical value of any sources of resistance and to permit an accurate evaluation of resistance.

K. Identification and Investigation of Diseases of Potential Industrial Crops.

In addition to the work with the peanut mosaic virus on Cassia leptocarpa and C. occidentalis reported above, a few plants of Vernonia anthelmintica were affected by an unidentified disease. Some plants gradually wilted and died. Others showed some leaf distortion and stunting. Possibly two distinct diseases were involved. Isolation tests failed to reveal the presence of pathogens in the tissue.

L. Compilation of Information on the Disease Resistance of Introductions from Other Personnel.

Lists of reports of disease resistance in introductions of Cucumis melo and Capsicum spp. have been compiled and distributed. Notes on the reaction of plant introductions to specific diseases and insects have been added to the seed catalogue as they were received. Data obtained during the past year includes the reaction of 87 introductions of Cucumis spp., primarily C. melo to Verticillium dahliae (microsclerotial type), and the reaction of 475 introductions of Citrullus vulgaris to the same pathogen. This data was supplied by Dr. C. B. Skotland, Prosser, Washington. Data on the reaction of 758 introductions of Cucumis melo to powdery mildew, caused by Erysiphe cichoracearum, was supplied by Dr. F. W. Whitaker, La Jolla, California.

Literature Cited

1. Kuhn, C. W. Mechanical transmission of a virus causing leaf mottling of peanuts. (Abstract) Phytopath 54:624. 1964.

2. Schenck, N. C. Fungicidal control of watermelon foliage diseases. In Fla. Agr. Exp. Sta. Ann. Rep. 1963, p. 373.

Report for S-9 Committee
July 22-23, 1964
I. A. Wolff - Northern Utilization
Research and Development Division

Chemical Screening Program: We received 1,100 new seed samples and 725 were given preliminary screening analysis. Included were first samples from South Korea, the seventh country in which PL-480 funds are being used to obtain collections. Gratifyingly, the rate of discovery of new chemical components in uncultivated species has continued to be high.

Examples of seed oil components found are:

a. New dihydroxy acids in *Cardamine impatiens*.
b. A new source rich in epoxy acid, *Euphorbia lagascae*.
c. A tetraunsaturated fatty acid not before reported in plants, *Echium plantagineum* and other borages.
d. A reactive unsaturated acid with the allene function, in selected mint seed oils.
e. A very complex oil having 35 per cent of unusual acid components including a new acetylenic acid, in *Helichrysum bracteatum*, strawflower.
f. A new 18-carbon triene acid having isolated *trans* unsaturation, in the Mexican composite *Calea urticaefolia*.

Screening 108 samples for seed mucilages has indicated the following four as having over 25 per cent gum: *Cassia javanica*, *C. hirsuta*, *Trigonella arabica*, and *T. gladiata*.

On advice of cooperating botanists screening of pulp fiber plants is being restricted to (a) samples carefully selected for high-yielding potential (b) more intensive screening of species varieties and types within genera previously selected as promising. Under category (a), there has been no activity during the past year due to paucity of samples; however, about 3 dozen good samples are now available and are receiving analysis. Under (b), emphasis has been on the evaluation of nine lines of sorghum grown at six widely-scattered locations under CR auspices. Partially-complete data suggests elimination of three lines from consideration, and shows some preference to Iowa and Indiana, with Georgia and Minnesota intermediate, and two Texas locations poorest. Evaluations were on the basis of dry solids yield, cellulose contents, and culm/leaf/head ratios.

Developmental Research:

Crambe: Outlook continues to be encouraging. (a) Thirty-six tons were successfully processed into oil, hulls and meal in a commercial plant using conventional equipment. Samples of the oil are being distributed to industry for testing in a variety of applications. The meal is under test at the Nebraska AES as a ruminant feed. Engineering studies on processing improvement are being continued.
(b) Effective low temperature plasticizers for vinyl resins have been made in the laboratory from derivatives which employ *Crambe* oil as the initial raw material. Industrial interest in these is high. (c) A research contract supervised by the Northern Division on the preparation and evaluation of special nylons from *Crambe* oil has been initiated during the last year at the Southern Research Institute, Birmingham, Alabama. (d) Basic compositional studies on *Crambe* meal have

been continued, with resultant isolation of new sulfur and nitrogen containing compounds either in the original or processed meal. The fate of these compounds in various processing treatments and the biological activity of these substances and their derivatives are being pursued.

Seed Gums: Endosperm flour (the seed fraction usually used for gum) was readily separated in good yield from 50 pounds of *Cassia occidentalis* seed. However, this fraction has more color, higher protein content and greater per centage of acid-insoluble residue materials than guar gum, these being less desirable properties. Utilization research may quite possibly improve the quality of this product but the extent of such research effort that would be worthwhile is dependent on the agricultural feasibility of raising such toxic seeds, a question that should be resolved by CR and the state agricultural experiment stations. *C. marilandica* seed is not toxic to rats in 56 days at a 5 per cent dietary level. Seed gum from this species performed as well as guar gum when evaluated at NU as a wet-end additive in paper handsheets.

Kenaf: Continued improvements are being made in processing treatments for kenaf to give good pulps. Kenaf pulps are more rapidly refined than wood pulps; this should result in power economy in a pulp mill. Mechanical pulps have been made for board making, with good control of fiber size and drainage rates. Bleachable mechanical and chemi-mechanical pulps of high opacity, good brightness and freedom from dark specks from the bark have been made in high yield. Such pulps are for use in blends for a variety of papers including newsprint, book, bond and printing papers. An industrial company is continuing its interest in kenaf by making experimental plantings on company-held lands in Alabama. Companies which manufacture harvesting equipment are watching closely the progress on annual fiber crops so that they can manufacture or develop suitable machinery when the time is ripe.

Other Oilseeds: At the Eastern, Western and Southern Utilization Research Laboratories chemical work continues to be fruitful on assigned oilseed crops -- *Lesquerella*, *Dimorphotheca*, *Vernonia*, *Limnanthes*, and *Cuphea*. In all of these cases production rather than utilization problems are limiting.

REPORT OF
THE NEW CROPS RESEARCH BRANCH, ARS, USDA
TO
REGIONAL TECHNICAL COMMITTEES

A. J. Oakes

This report is designed to bring to the technical committees a summary of research of the New Crops Research Branch for the reporting period, April 1, 1963 through March 31, 1964. It is based on the annual "Multiple Use Report" which is used to inform Advisory Committees and others of the Branch activities. Although a portion of this report reflects other than regional programs, our research is so overlapping that all of the activities reported here are of interest to the technical committees.

USDA AND COOPERATIVE PROGRAM

The nature of this program is to conduct investigations concerned with the introduction, evaluation and maintenance of plant germ plasm for the development of a strong yet diversified agricultural program for the United States. Research involves a continuing assessment of the world's plant resources; procurement of stocks through exploration and international exchange; the evaluation of the introductions either as breeding stocks, as potential new crops or for land reclamation and conservation purposes, through a national cooperative research effort, and the preservation of these materials either as seed or as vegetative stocks. Leadership for this program is at Beltsville, Maryland.

Four national introduction stations are responsible for evaluation, maintenance and/or quarantine of new introductions which require special handling: Chico, California; Miami, Florida; Savannah, Georgia; and Glenn Dale, Maryland. The responsibility for preservation of seed stocks of national interest lies with the National Seed Storage Laboratory, Fort Collins, Colorado. Cooperative new crops studies to determine significant agronomic characteristics of plants having valuable end-products are conducted cooperatively with esperiment stations of Alabama, Montana, Nebraska, North Carolina, South Carolina and Texas. Four regional and one inter-regional introduction stations deal with the evaluation of crop breeding stocks essential to programs in state experiment stations.

Ten P.L. 480 projects are currently active, all having to do with the collection and screening of native plants of potential use in the agriculture of the United States. These countries and grant amounts are as follow: Colombia (S5-CR-1) - $113,159; India (A7-CR-52) - $20,752; Israel (A10-CR-10)-- $115,555; Israel (A10-CR-11) - $87,337; Korea (A13-CR-1) - $46,692; Pakistan (A17-CR-5) - $60,449; Spain (E25-CR-11) - $156,583; Turkey (A22-CR-1) - $134,444; Uruguay (S9-CR-3) - $114,024; Yugoslavia (E30-CR-2) - $30,000.

The <u>Federal</u> scientific effort devoted to research in <u>New Crops</u> totals 38.5 man years. Of this number, 3.0 are devoted to international plant exchange, 3.2 to botanical investigations, 6.2 to special plant procurement and botanical activities. Research on new crop evaluation includes 8.7 man-years for horticultural research, 3.8 for agronomic studies, 6.1 devoted to evaluation of potential new crops, 4.0 to pathology, and 3.5 to maintenance of germ plasm.

PROGRAM OF STATE EXPERIMENT STATIONS

While responsibility for collecting and introducing plant material into this country rests predominantly with the Department, the State stations cooperate actively in the preservation, multiplication and preliminary evaluation of such materials and in domestic and other explorations for the introduction of new materials. An elaborate system supported in part by the States and in part by the Department has been organized for the purpose of placing introduced materials in the hands of interested plant researchers throughout the country. This system consistes of a series of 5 plant introduction stations located respectively in Geneva, New York; Experiment, Georgia; Ames, Iowa; Pullman, Washington; and Sturgeon Bay, Wisconsin. Research of the State stations is organized and coordinated through 4 regional projects and 1 inter-regional project: NE-9, Discovery and Preservation of Valuable Plant Germ Plasm; S-9, The Introduction, Multiplication and Evaluation of New Plants for Industrial and Agricultural Use and the Preservation of Valuable Germ Plasm; NC-7, New Plants - for Industrial and Agricultural Utilization; W-6, The Introduction, Multiplication, Preservation and Determination of the Value of New Plants for Industrial and Other Purposes; and IR-1, Introduction, Preservation, Classification, Distribution and Preliminary Evaluation of Wild and Cultivated Species of Solanum. All 50 states and Puerto Rico cooperate in this research. Cooperation between the State stations and the Department in this program is outstanding and of great mutual benefit.

The total research effort on replacement crop introduction and evaluation at the State stations is approximately 60.0 professional man-years.

PROGRESS -- USDA AND COOPERATIVE PROGRAMS

A. Plant Introduction

1. Breeding Stock Introduction. The plant-exchange program during the past year resulted in 8,908 introductions from and 1,615 shipments to some 122 countries. This is the greatest number of introductions received since 1953, excepting 1957. Major emphasis remains on forage plants (2,394 introductions), cereals and sorghum (2,221 introductions) and vegetables (1,450 introductions).

a. International exchange. Special note is made of the exchange with the U.S.S.R. and satellite countries which provided a total of 2,026 introductions. Other major exchanges by crop and origin are as follows: 329 lots of tuber-bearing Solanums - Latin America, 224 vegetable lines - India, 256 oat varieties - West Germany, a world collection of 400 cynodons, 271 millets - Africa, 250 peanut varieties - India, 115 guar samples - India, 260 forage grasses - Israel, 350 legumes and grasses - Spain.

b. Foreign exploration. Two explorations were undertaken for breeding stocks. An exploration in the Soviet Union resulted in the Collection of 150 fruit and ornamental breeding stocks, mostly seeds collected in the wild in Central Asia, Crimea and Moldavia. This was the first collecting by U.S. explorers in the U.S.S.R. in 30 years. An exploration to South Africa was initiated in February 1964 for warm-season grasses of special interest to research workers in southern United States, especially disease resistance and cold tolerance in *Digitaria*.

c. Domestic exploration. Collecting in cooperation with the regional new crops programs resulted in the following: NE-9, 19 selections of wild highbush blueberries were added to the collection originally assembled in Maine in 1959 and a survey of low-temperature tolerant vegetable varieties used in Canada was undertaken by the Rhode Island AES; NC-7, the project on collecting small fruits in Alaska was terminated and seed increase of *Rubus* collections will now be transferred to the regional plant introduction station at Ames, Iowa; S-9, 18 additional local collections of fruits were added to the Louisiana collection. The presence of virus diseases in some of the collections points up the need to index this material before any of it is released to other locations; W-6, a collection of 100 wild types of *Ceanothus* from Oregon and Washington has been assembled for propagation. Although difficult to propagate, several lines with ornamental merit have been supplied to interested workers.

d. Support for AID missions. The special plant project provided AID missions with a total of 3,715 lots of seeds or plants, an increase of 35% over the average of the previous three years. The greatest increase in use of materials provided by this program was in Latin America - 2,628 items (13 countries) followed by Africa/Europe - 531 items (18 countries), Near East/South Asia - 482 items (9 countries), and Far East - 74 items (5 countries). In all, 45 countries received research stocks, procured through this project.

The cacao, coffee and rubber germ plasm center at Miami continues to increase in new varieties. One-hundred-ninety-four elite clones of cacao are now established at Miami, Florida. A new technique of scion grafting cacao in place of the standard patch-bud method has increased the survival per centage and also permits earlier reading of virus indicators. The coffee collection has been increased by several species of *Coffea* possessing resistance to a number of races of rust and studies on vegetative propagation of these lines is underway.

e. Maintenance of germ plasm. Good progress has been made in depositing germ plasm in the National Seed Storage Laboratory, Fort Collins, Colorado. Seven thousand items were added, bringing the total in preservation to 29,000 lines. The transfer of all breeding stocks of cotton has been completed, including American upland cottons from Mississippi AES and species held at the Texas AES. Forty-nine corn lines of proven germ plasm merit have also been deposited. Supplemental inventories of eight crops plus initial inventories on sugar crops and annual ornamentals were published.

Studies on retention of viability of seeds of lettuce, safflower, sesame, crimson clover and sorghum in sealed containers showed that at temperatures below 50°F. high viability was retained for 36 months even at moisture contents up to 10%. When these same crops were stored in sealed containers at 4% moisture, viability was maintained for 36 months throughout a temperature range of 10°F. to 90°F.

The primary phase of the survey of fruit and nut clones in the U.S. conducted at the request of the "New Crops" National Coordinating Committee, will be completed during calendar year 1964. Part 1, dealing with apples, and Part 2, on stone fruits, have been printed and distributed to breeders. Part 3, which includes pears, nuts and miscellaneous fruits, is in press.

Although no issues of the Printed Inventory of Plants Introduced appeared in 1963, No. 163 (1955) is at the Government Printing Office, and No. 164 (1956) and No. 165 (1957) are in the hands of the editors.

2. Plant Resources

a. Plant identification and classification. Additional herbarium specimens of *Lolium*, obtained from Europe, continue to provide basic information on morphology and geographic distribution of species. A literature review covering the last forty years of research on *Lolium* has provided special information on breeding behavior and taxonomic relationships. More than 300 names are involved in the descriptive literature of *Lolium*. Extensive field collections of *Agave* provided flowering specimens vital to an adequate revision of this genus. Geographic origins of several species were established for the first time. A total of 310 CR manuscripts were checked for accuracy in the use of nomenclature for vascular plants and 1,366 plant specimens were examined by Branch taxonomists.

b. Botanical investigations on new crops. During the fall of 1963, a special effort was made to procure plants for the pulp-fiber testing program during a field trip to Mexico. Procurement was virtually limited to the Leguminosae, Melvaceae and Gramineae, known by previous screening experience to have the most potential. Within these families, only those species with the most favorable agronomic characteristics were collected. In order to provide advanced evaluation data on the species collected, photographs and field notes were made, including bulk estimates based on the yield of wild stands.

The best prospects encountered were members of the Leguminosae and species of *Crotalaria*, *Dalea*, *Desmanthus*, *Desmodium*, *Indigofera* and *Sesbania* were collected. Of these prospects, three species in particular, *Aeschynomene* sp., *Dalea leporina* (Ait.) Bull., and *Crotalaria incana* L., are of special interest to the new crops program. These are tall, fast-growing summer annuals with the desired erect habit and reach heights of 2 to 3 meters. All rapidly colonize disturbed, open habitats such as road margins and fallow fields and from all indications could readily adapt to the conditions of cultivation. They were also found to be heavy seeders and samples have been sent in for gum analysis.

Chemists at NU report that the oil of *Crepis foetida* may well be the most versatile of all discovered in the screening program so far. *C. foetida* is native to Turkey, but many species of this genus are to be found in western North America. The Turkey P.L. 480 project has been alerted to collecting seed of all species of *Crepis* in that country but we should also thoroughly sample our native species.

Promising leads: During the reporting year the oilseed and pulp screening programs have identified fifty-one species, representing ten plant families as being of sufficient promise to merit further chemical and preliminary agronomic evaluation. These leads constitute the recommendations given Chemurgic Crop Investigations for increase at Federal and regional stations.

Anti-tumor screening: Since July 1, 1963, 776 plant samples have been supplied to laboratories designated by the Cancer Chemotherapy National Service Center for preparation of extracts for anti-tumor screening. This number includes 664 samples for general screening, 32 recollections of small samples needed to complete general screening and 80 recollections of confirmed activities. About 600 general collections and about 15 recollections are now on hand and will be accessioned before June 30, 1964.

The 80 samples of confirmed actives collected since July 1, 1963, represent about 40 species. Recollection was made during the past season of about 80% of the samples that confirmed in time to be collected during that period. The 20% that were not collected are largely those from isolated areas that collectors did not visit during the season, samples from P.L. 480 projects or seed samples from commercial sources.

The yield of confirmed actives has continued high. The Ethiopia collection will yield about 40 confirmed-active samples, equivalent to more than 10% of the samples collected. This has been the most productive collection of material assembled for this program. It will surpass in yield of confirmed actives a special collection from Central America that consisted solely of medicinal plants, many of which are in local use for treatment of cancer or cancerlike diseases.

The distribution of anti-tumor activity continues to be widespread among higher plants and not confined to a limited number of families as might be anticipated However, the Apocynaceae, Compositae and Euphorbiaceae continue to be the most promising families. An appreciable amount of activity, involving possibly as much as 50% of the confirmed actives appears to be associated with the presence of alkaloids.

Studies on plant constituents: Studies on plant sources and uses of gums, resins, and waxes resulted in submission of three technical papers on gutta or insoluble gums of industrial value. A manuscript for a new bulletin on "Growing Ginseng" has been provided to answer the numerous requests for cultural information on this plant. It will supersede FB 1184, now out of print.

As a phase of the Crops Protection Branch project on defoliation of woody plants for DOD, taxonomic and ecological studies were undertakin in Puerto Rico and Thailand to study the principal forest types as a basis for effective interpretation of reaction of tropical and subtropical plants to chemical defoliants. These field studies will serve to determine the forest components common to both areas as an aid to selection of test sites.

c. P.L. 480 projects. Except for the collecting of some gum and pulp samples, practically all samples entering the screening program during the reporting year were supplied by P.L. 480 projects. These sources provided 1,540 samples, 230 of which went into the cancer-screening program. Most of the rest were seed samples for the oilseed-screening program. By project, the following numbers of samples were supplied: Israel (A10-CR-10) 367; Korea (A13-CR-1) 49; Pakistan (A17-CR-5) 174; Spain (E25-CR-11) 243; Turkey (A22-CR-1) 170; Uruguay (S9-CR-3) 116; Yugoslavia(E30-CR-2) 195. Collections from Israel included about 150 accessions of clover, grasses, and miscellaneous for breeding stock germ plasm. The small number received from Korea reflects the first season's activities of a new project. Israel (A10-CR-11) is too recent to have accomplished any results.

Samples accessioned during the reporting year almost equaled the number analyzed by NU. Our backlog carry-over from last year, about 400 seed samples, remains; but NU, due to recent budget increases, is now in position to accelerate their preliminary screening work.

Steroidal alkaloids from Solanaceae: Two P.L. 480 projects and General Mills (Minneapolis) are involved with us in searching the Solanaceae for solasodine and related steroidal alkaloids. We have provided General Mills with 59 samples for analyses. They have reported on 17.

The Colombian project (S5-CR-1) has been profitably active during the reporting year. Up to this date they have analyzed sixty species of Solanaceae. Of these, sixteen have been found to contain steroidal alkaloids in concentrations from less than 0.1% to about 7.0% on a dry-weight basis. Ten species have steroidal alkaloid contents higher than 2.0% in their fruits. One, an unidentified species known as Valdivia 4, has 6.0% in the fruit and 2.0% in the leaves. We are attempting identification of this species and will then be able to assess its potential as a crop source of solasodine.

The Indian project (A7-CR-52) has begun the collection of samples for analysis but no analytical results have been reported.

B. New Crop Evaluation.

Evaluation of Breeding Stocks. Research emphasis is directed toward locating new sources of disease resistance, determining characters which will enhance adaptation and crop versatility and developing new varieties of agronomic horticultural and chemurgic crops at Federal introduction stations and through regional cooperative programs

1. Horticultural Crops.

a. Fruits and nuts. Research at Chico, California, on Actinidia chinensis, the Chinese gooseberry, has established the optimum temperatures for seed germination. Alternating the temperature, 8 hours at 70°F. and 16 hours at 50°F., gave the best results. Other studies showed that the minimum threshold for the high temperature phase was between 60° and 70° F. Seed held at sustained temperatures of 60°F. or lower failed to germinate. Research on soil fumigation treatments resulted in recommendations for production of nematode-free actinidia seedlings. Methyl bromide, 1 lb/100 sq. ft. of loose soil, can be relied upon to produce clean stock. Seedlings grown in untreated soil are usually infected with one or more nematode species.

Severe weather conditions curtailed fruiting of stone fruits at Chico, California, particularly almonds and apricots. Despite the fact that most apricots were poor, two Turkish seedlings, P.I.'s 248779 and 255319, set good crops, rated 4 on a yield scale of 1 to 5. Of 22 English walnut selections from the U.S.S.R., four accessions have shown extreme precociousness, producing nuts in their second and third years from seed.

Observations on orchard plantings of pistachio in California show that Verticillium wilt is a critical factor in the establishment of this new crop. If pistachio is to succeed in areas where cotton has been grown, wilt resistant rootstocks are essential. Evaluation of rootstocks for this purpose as well as for hardiness and compatibility is a major objective in the pistachio program at Chico, California.

Among the apples which came into bearing at Glenn Dale, Maryland for the first time, 'Tohoku', P.I. 255900 (Japan) is a promising variety. It is a September bearer with attractive crimson over yellow skin, good quality flesh and flavor.

The studies at Glenn Dale on incidence of natural infection of cherry leafspot show P.I. 's 186943 and 202119, seedling selections made at Glenn Dale from varieties originally from Germany, as having the highest resistance to leafspot of all *Prunus avium* progenies evaluated.

Significant gains have been made in indexing *Prunus* introductions for viruses. Thirty-six varieties were included in the indexing program and tests were completed on 18 of these. In addition, 10 cherry varieties from material introduced in 1960 were released to breeders as virus-negative.

From a seedling population of 'Arue' avocado which has come into bearing at Miami, Florida, one seedling compares well with midseason varieties grown commercially and will be evaluated further for production and quality.

Hardiness studies on lychee at Miami, Florida and observations on damage as a result of the severe 1962-63 freeze, show that this crop will be restricted in range to about that of the Mexican avocado and Persian lime. Storage studies on lychee in relation to retention of fruit color, flavor and keeping quality showed P.I. 51471 is conclusively superior to all other introductions when stored at 10°C. and may prove to be an excellent variety for shipping purposes.

b. Vegetables. During 1963, about 100 new potato introductions were indexed at Glenn Dale for virus diseases of which half were detained for further study. Only 20 introductions were released as virus-free while 24 contained viruses already present in the U.S. This latter group will be grown under quarantine at the Sturgeon Bay Introduction Station for true seed production. Five new potato varieties released in 1961 and 1962 by U.S. breeders contained from 3 to 6 foreign introductions in their pedigree.

Waterchestnut research at Savannah resulted in determination of seed treatments essential to germination. Soaking for 90 minutes in 96.2% H_2SO_4 ruptures the bony endocarp and permits germination. Currently, all waterchestnut research is based on vegetatively-produced stocks. Seedling population research will afford the possibility of determining genetic variability in the waterchestnut. Preliminary fertilizer trials with phosphorous indicate increased yields of market quality corms with applications of up to 66 pounds of phosphorous per acre. Two-hundred-thirty-three pounds of propagating corms of waterchestnut were distributed to growers wishing to cultivate this new crop.

Regional cooperative research programs: Highlights of findings resulting from the expanding use of plant introductions, especially as sources of disease resistance, are as follows:

Allium cepa, P.I. 249903 (Spain) and *A. fistulosum*, P.I. 274254 (Japan), have shown resistance to pink root rot (NC-7). *Cucumis* sp., P.I. 164797 (India) is resistant to angular leaf spot (NC-7) and *Cucumis sativus*, P.I. 164756 (India), is resistant to powdery and downy mildew and fruit rot (S-9). A pepper introduction, P.I. 264281 (Florida), is resistant to two strains of potato Y virus (S-9) and the newly-released lettuce, 'Valmaine', grown in Texas, owes mildew resistance to P.I. 167150 (Turkey) and mosaic tolerance to P.I. 120965 (Turkey) (S-9).

The curly-top resistant tomato, 'Payette', owes its disease resistance to Lycopersicon hirsutum, P.I. 126936 (Peru) (W-6) and a selection of L. pimpinellifolium, P.I. 127805 (Peru) has shown resistance to bacterial wilt in Hawaii through 9 generations (W-6). A carrot introduction, P.I. 225868 (Denmark) carries resistance to Alternaria, Cercospora and Aster Yellows, and P.I. 226043 (Japan) also carries Aster Yellows resistance (Beltsville).

Introductions which have contributed horticultural characters are as follows: P.I.'s 263058 and 263060 (U.S.S.R.) are high quality cabbage varieties. The former is a late-maturing type, highly suited for kraut, while the latter is early, crisp, of good flavor and develops medium size heads (W-6). Two broadbeans, P.I.'s 223302 (Afghanistan) and 244345 (Ethiopia), are acceptable for freezing types (W-6) and a large-seeded white bean 'Blance Alubia de Asturia' P.I. 226856 (Spain), is of considerable commercial interest (NE-9).

The 'Summer Tomato' developed by Texas AES has P.I. 190256 ('New Caledonia') as a parent. This new release sets well in warm weather and is resistant to cracking, puffing, catfacing and blossom-end rot (S-9).

c. Ornamentals. A selection of a dwarf pomegranate introduced from China as P.I. 43793 has been named 'Chico' by California nurserymen. It makes an excellent pot plant as well as serving as a foundation plant.

Progeny studies at Glenn Dale, Maryland, on 511 seedling of crosses between introductions of Ilex cornata and I. ciliospinosa have been analyzed for expression of genetic characters and the results have been interpreted statistically. Characters studied were: leaf blade outline, number of leaf spines, cold hardiness, fruit size and fruit shape. Results showed varying degrees of dominance and indications of matroclinous inheritance.

Interspecific crosses at Glenn Dale, Maryland, of nine introduced Camellia species yielded approximately 6% set. Among crosses where a hexaploid male parent was used with a diploid female parent, four stages of embryo development were noted - 66% abortive embryos, 17% partially-developed embryos but structurally disorganized, 6% partially-developed and otherwise normal-appearing embryos, and 11% normally-developed embryos. Embryo culture was effective in obtaining some plants from certain of the partially-developed embryos which were sufficiently organized to continue differentiation. Propagation studies on subtropical ornamentals at Miami resulted in the following: Ipomoea wolcotticana, P.I. 103932 and 144004, has been grafted onto a bush morningglory successfully. This tree morningglory is an excellent ornamental if a means of propagation can be found. Eighteen per cent of the grafts tried on the bush type were successful. Butea monosperma is a desirable ornamental legume but has not been propagated asexually. Selections of introductions have been successfully grafted onto seedlings attaining up to 60% success. Tip cuttings under mist failed completely.

Regional cooperative programs: Ornamentals of note were as follows: Ligustrum vulgare P.I. 107630 (Yugoslavia) has been outstanding as a hardy shrub in the Central states and is now being propagated in quantity by nurserymen (NC-7). In the Southeastern states, Eleagnum umbellata P.I. 237867, as well as Osmanthus variety 'Gulftide'

P.I. 213308, and Eurya emarginata, P.I. 240914, continue to be in demand by nurserymen. Quercus acutissima, P.I. 168939, has been widely distributed in the southeast and has attracted attention because of its precocious, heavy yields of acorns attractive to deer and squirrels (S-9).

2. Agronomic Crops.

a. Forage Crops. The emphasis in this area is on evaluation of grasses and legumes for multiple purposes: i.e., determining insect host ranges, phylogenetic studies, plant type improvement programs and disease resistance. Among the characters specifically sought after are cold, disease and-or insect tolerance, high yield, good spring and fall recovery, stand persistence, palatability, digestibility and adaptation.

One outstanding introduction has been Agropyron elongatum, P.I. 98526 (U.S.S.R.), which has contributed to at least two cultivars, 'Nebraska', and 'Alkar'(NC-7). An introduction of Rhodesgrass, Chloris gayana, P.I. 151008 (Kenya), is a source of high resistance to scale, a major disease of this grass in the southwest. A clone will be released in the near future by Texas AES (S-9). Two accessions of Digitaria valida, P.I. 209177 and P.I. 209372 (South Africa), are promising parental lines because of high seed production in Puerto Rico (S-9).

South African grasses, Panicum stapfianum P.I. 178257, Iseilema wightii P.I. 271-049 and Eragrostis superba P.I. 276055, have all shown exceptional cold tolerance (W-6). Vicia cracca, P.I. 234266, similar to hairy vetch is under observation as a new forage crop in the northeastern States (NE-9). The new Georgia AES synthetic 'Gasyn' is a combination of several USDA introductions of Lespedeza sericea (S-9). Two timothy introductions, P.I's 285539 (Italy) and 285540 (Poland), are highly tolerant to rust (NE-9), and the tetraploid timothies, P.I.'s 234724 (France) and 234445 (Belgium), have shown desirable forage grass traits (NC-7).

A clover, Trifolium hybridum, P.I. 246751 (Spain), is relatively free from Stemphyllium leafspot and exhibits good spring and fall recovery.

Increased seed production in zig-zag clover, T. medium, has been attributed to the use of P.I.'s 284621 and 285047 from New Zealand (NE-9). Among newly released clovers, 'Nile' is the result of combining several introductions of Trifolium alexandrinum and is promising for forage and green manure (NC-7). The improvement of other clover species is given in a few scattered reports from widely-scattered areas throughout the country. Most of these studies include field evaluations for winter hardiness and disease resistance. Concentration on plant type and root-knot nematode resistance is reported for white clover. In addition, Trifolium introductions are being used on an increasing scale in basic investigations involving cytotaxonomic relationships within the genus. This widespread interest by clover investigators culminated in the compilation of an inventory of clover stocks throughout the U.S., CR 69-63 "Inventory of available clover introductions." This inventory which includes all stocks held by four Regional Plant Introduction Stations, Forage and Range Research Branch and Soil Conservation Service, has been made available to all those researchers in this country interested in clover research. One-hundred-twenty-eight species comprising over 2,000 accessions are included in this report.

b. Cereal crops. Among the many accessions of *Zea mays* being screened annually by breeders for disease and insect resistance, P.I. 217407, 'Iowa Ladyfinger', is resistant to northern corn leaf blight.

c. Fiber crops. In search for natural resistance to cotton insects, the Boll Weevil Laboratory is screening numbers of plant introductions. Texas AES has released several breeding lines of cotton derived from plant introductions and the new 'NC Margin' from the North Carolina AES containing high general combining quality is derived from introduced germ plasm.

3. Chemurgic crops.

a. Oilseeds. *Crambe abyssinica* as a potential oilseed crop continues to be the most significant accomplishment of the joint Crops/Utilization research program. The seed oil of *Crambe* contains plasticizers essential to the plastics industry and the meal has potential feeding value. During 1963, *Crambe* was grown by farmers in six Western states to produce more than 40 tons of seed required by ARS research scientists. Seed yields of up to 2800 lbs/A have been collected with *Crambe* and the requirements for seeding, fertilizing and harvesting have been established by cooperative research between CR and State Experiment Stations. Selection studies show that there are opportunities for development of *Crambe* lines with increased yeild and oil content. Over 600 acres of *Crambe* will be grown in the summer in 1964.

Vernonia anthelmintica. The epoxy fatty acid in the seed oil in *Vernonia* is of great interest to a number of industries. This product is currently obtained from the epoxidization of vegetable oils and *Vernonia* is the only significant natural-occurring source of this material that has been discovered to date. In the 1963 season, experimental plantings were made in approximately 35 locations in 24 states. Seed yields at Glenn Dale, Maryland, were 2,000 pounds or more per acre on the better plots. Several plantings were made to increase seed for pilot-plant commercial extractions. Attention is being given to plant selection for crop improvement breeding programs. The undesirable characteristics of seed ripening over an extended period, plus seed shattering at maturity will have to be modified. Another approach to this problem may be the development of methods for repeated harvesting at intervals during the season.

Fennel (*Foeniculum vulgare*), which contains petroselinic acid in its seed oil, is widely adapted in the United States; however, considerable work will be necessary to demonstrate the feasibility of production for this purpose. On the basis of yield reports and oil composition, it appears that related species such as dill, parsley and celery should be included in further evaluations. Fennel and dill seed can be successfully produced in Oregon and California. Dill is probably easier to grow and slightly outyields fennel. Very limited commercial production of these species indicates that yields of 800 to 1,000 pounds of seed per acre can be produced. Fall plantings were made in Oregon, California and in certain states that cooperate in the S-9 regional program.

b. Annual pulp crops. Excellent yields of kenaf (*Hibiscus cannabinus*) and sunn hemp (*Crotalaria juncea*) were obtained at some locations in 1963. For example, kenaf 'Everglades 71' yielded more than 8 tons per acre when grown in 14-inch rows at Nebraska, and approximately 9 tons of sunn hemp stalks were produced per acre in a Kansas test.

Inadequate moisture, unfavorable soil conditions and low temperatures contributed to low yields at certain locations. Kenaf appears more promising than sunn hemp as an annual pulp crop. Poor stands and poor plant development have restricted yields of the latter species.

Seven sorghums, that were evaluated agronomically for the first time, and two Sorghum almum introductions were grown at six locations in 1963. Of these, two South African lines, a broomcorn and the S. almum entries were the most promising. The yield potential of these sorghums, especially in Iowa, Indiana and Georgia, appears quite good. Dry conditions limited yields at two Texas locations. Samples of all test entries were submitted to the Northern Utilization Laboratory for pulping evaluation.

c. Other new crops. Preliminary agronomic evaluation of various plant species, that are of interest because of seed oil constituents, seed gums or stem fibers indicated a good crop potential for the following species:

Iberis amara, P.I. 288261 (erucic acid source) is a vigorous, erect plant that retains its seed well. It is readily adapted to mechanical harvest.

Raphanus raphanistrum, P.I. 271451 (erucic acid source) produces pods that may be up to 21 inches long. Good seed yeilds were obtained in Kansas, Indiana and Minnesota. This plant tends to lodge.

Cassia occidentalis is probably the most promising species among the plants that have been evaluated as seed gum sources. Although the seeds are quite toxic to warm-blooded animals, it is probable that C. occidentalis will not receive the same objections and prohibition that the Crotalarias, specifically C. spectabilis, have in certain states. Seed yields of about 1,800 to 2,300 pounds per acre were obtained at Experiment, Georgia, and Talassee, Alabama, respectively.

Research of dioscorea has been curtailed owing to limited crop potential and an undiminished natural supply of wild dioscoreas.

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COLLECTIONS MADE IN SOUTH AFRICA

	No. Species or Genera	Seeds	Vegetative	TOTAL
Digitaria	23 (S)	45	272	317
Grasses	44 (Veg.)	237	46	283
Miscellaneous	60 (Veg.)	137	31	168
TOTAL	127	419	349	768

REPORT OF THE SOIL CONSERVATION SERVICE ON PLANT INTRODUCTIONS TO THE S-9 COMMITTEE

W. C. Young

The Soil Conservation Service begins its plant materials work at three principal centers -- Americus, Georgia; Arcadia, Florida; and Coffeville, Mississippi. Each of these handles some of the plant introductions. Some P.I.'s were duplicated at two or more of the centers. The service follows up its plant materials work by field plantings which are done on Soil Conservation District cooperators' farms. The area covered by this report includes nine southeastern states and Puerto Rico. Eight-hundred-seventy-five accessions were received in 1963 which represented 59 genera. Most of the plants were either forage or range-type grasses and legumes, or materials with potential food value for wildlife. They include:

Aeschynomene
Alysicarpus
Andropogon
Apluta
Arachis
Ardisia
Aristida
Astragalus

Bothriochloa
Brachiaria
Bromus

Cajanus
Canavalia
Catharticus
Cenchrus
Chloris
Chrysopogon
Cyamopsis
Cymbopogon

Desmanthus
Desmodium
Digitaria

Echinochloa
Eragrostis

Hibiscus

Ilex
Indigofera
Ixophorus

Lathyrus
Lespedeza
Leucaena
Lolium
Lotononis
Lotus
Lupinus

Medicago
Myrica

Ornithopus
Oryzopsis
Osmanthus

Panicum
Paspalum
Pennisetum
Phalaris
Phaseolus
Phyllostachyus
Poa
Psoralea

Salix
Setaria
Sorghum
Stipa
Stylosanthus

Tetrachne
Themeda
Trifolium

Vicia
Vigna
Voandzeia

Nine accessions were distributed for increase by farmers. They were:

Arachis glabrata, P.I. 118457
Arachis monticola, P.I. 263393
Digitaria eriantha, P.I. 106636
Glycine ussuriensis, P.I. 163452
Lupinus elegans, P.I. 185099
Trifolium vesiculosum, P.I. 234310 (Amclo)
P.I. 233782 (Late)
P.I. 233816 (Midseason)
Vicia lutea, P.I. 249880

One of these, Trifolium vesiculosum (Amclo clover), P.I. 234310, was formally released through the Crop Improvement Association in Georgia.

The more important species which are still under observation include:

Andropogon scoparius, P.I. 216751, 216752
216759, 217039
Chrysopogon montanus, P.I. 213885, 215586
Echinochloa coarctata, P.I. 223254
Echinochloa crusgalli, P.I. 256392
Echinochloa holobii, P.I. 207924
Eragrostis atherstonei, P.I. 276033
Eragrostis robusta (P.I. number unknown)
Lespedeza intermixta, P.I. 246770
Lespedeza virgata, P.I. 218004
Panicum makarikariense, P.I. 210692
Panicum miliaceum, P.I. 196292
Paspalum nicorae, P.I. 202044, 276248, 276249
Pennisetum ciliare, P.I. 210693
Phaseolus lathyroides, P.I. 276183
Stylosanthes sundaica, P.I. 187098

The number of plants received at each station, the number of releases which have been distributed, the number of the more important species and the amount of seed or planting stocks distributed was as follows:

	Americus	Arcadia	Coffeeville
Number of P.I. Accessions Received:	178	532	343
Number of Genera Represented:	24	35	25
Number of Accessions Distributed for Increase:	5	3	3
Number of More Important Species still Under Observation:	11	10	6
Seed Distributed:			
Number of Species	4	2	14
Number of Pounds or Amount	700 lbs.	1,200 lbs. 500 bu. rhizomes	1,200 lbs. 3,000 tillers
Publications	1	2	0

Three publications resulted from work done with materials originating through plant introductions. They were:

1. E.R. Beaty, John D. Powell and R.A. McCreery. AMCLO -- a high-yielding winter clover. Ga. Agr. Exp. Sta. Circular N.S. 35, June, 1963.

2. C.B. Blickensderfer, Harry J. Haynsworth and Robert D. Roush. Wild peanut, a promising forage legume for the upland soils of Florida. What's New in Crops and Soils (to be published).

3. Harry J. Haynsworth, C.B. Blickensderfer and Robert D. Roush. New lupines for winter cover crops in Flordia (to be published).

Collection of Domestic Fruit Stocks

This project was initiated in 1959 to collect domestic fruit stocks in the coastal region from Texas to South Carolina. Pomologists at Agricultural Experiment Stations in Alabama, Georgia, Louisiana, Mississippi, South Carolina, and Texas have collected propagating material from approximately 250 clones of *Prunus*, *Malus*, *Pyrus*, *Ficus*, *Citrus*, *Vitis*, *Carya*, and *Castenea*. One-hundred-thirty-three accessions have been documented and transferred to Idlewild Farm of the Louisiana Experiment Station for propagation and maintenance. P.I. numbers have been requested for 41 more accessions now held at the Texas Experiment Station. Field collection notes for propagating stocks still held at State College, Mississippi; and Experiment, Georgia are being summarized for assignment of P.I. numbers to those materials.

In 1961 a rather severe outbreak of phony peach disease was recognized throughout the peach and plum accessions plantings that had been collected and transplanted at Idlewild Farm. Assistance and guidance as to what procedure to take was sought from Mr. R. N. Dopson, Area Supervisor for Plant Pest Control Division, ARS, Commerce Building, Baton Rouge, La. After a rigid roguing program for 2-1/2 years, Mr. Dopson suggested that all plum trees and most of the older trees of the peach variety and selections planting be destroyed.

Further assistance was sought from Dr. I. L. Forbes, Plant Pathology Department of LSU, on this program. Dr. Forbes advised us to destroy all questionable material. Therefore, in an attempt to salvage a few trees of the better plum and peach selections, a limited amount of budding was done in 1963.

The method of handling bud-wood as recommended by Dr. Glenn E. Kenknight from his work in phony peach control in the Georgia area was followed. After the small amount of budding was done, all trees of the plum planting and practically all of the peach planting were removed and burned, and an insect vector spray program was rigidly followed to control the insects that were helping in the spread of the phony peach disease at Idlewild.

Most of the original trees are still standing and will afford a limited amount of bud-wood for an almost complete recovery of trees of this valuable fruit collection when, and if, the time comes that we will have the phony peach problem completely under control at Idlewild and feel that we can safely bring this material into a more or less quarantined location at Idlewild or elsewhere to be grown out and indexed for freeness to virus disease problems so that these selections can be utilized for the purpose that was intended.

No out-of-state stone fruit plant material additions are being accepted for the Idlewild planting unless it is certified as being virus-free.

APPENDIX B

1965 Chart of Responsibilities

S-9

CHART OF RESPONSIBILITY 1965

Objective	Type Activity	State Station and Federal Agency
1. To participate in the coordinated program of foreign and domestic plant exploration and introduction to obtain new plants for agricultural, industrial and other uses.	1. Collection of fruit stocks near Gulf Coast and in coastal plains area of South Carolina and Georgia.	Agr. Expt. Stations in Ala., Georgia, Florida, Louisiana, Miss., S.C. and Texas. NCRB, ARS.
	2. Coordinate requests for new plant materials and forward them to the New Crops Res. Br., ARS.	Regional Plant Introduction Station, Experiment, Georgia
	3. Seed lists and reports of S-9 activities will be exchanged for similar reports of the other three regional new plants projects. All such reports and seed lists, including those of the S-9 new plants project, will be distributed to plant scientists in the Southern Region.	Regional Plant Introduction Station, Experiment, Georgia, and the S-9 committee member representing each state station and the Soil Conservation Service.
	4. Collect native species of Puerto Rico that may be of potential value.	Agricultural Experiment Station, Rio Piedras, Puerto Rico.

CHART OF RESPONSIBILITY 1965

Objective	Type Activity	State Station and Federal Agency
2. To multiply, evaluate, maintain and preserve germplasm of introduced plant materials for the Southern Region.	Increase new plant materials received since the last planting season and make them available for further evaluation at state stations and S.C.S. Plant Materials Center. Test germination of seed in storage and increase those low in supply or viability. New introductions will be observed for useful horticultural and agronomic characters and for the presence of disease and insects.	Regional Plant Introduction Station, Experiment, Georgia
	Introductions will be screened for disease resistance in the greenhouse. Field notes on the reaction of introductions growing in the Regional Station nursery will be taken when disease distribution and severity are adequate to yield reliable results. Disease and insects occurring in the nursery will be identified. Supporting research will be conducted on disease-causing organisms to facilitate the screening of plant introductions for disease resistance and their utilization as sources of disease resistance.	Regional Plant Introduction Station, Experiment, Georgia
	Seed of introductions of potential economic value will be stored as working stocks for research workers in the Southern Region.	Regional Plant Introduction Station, Experiment, Georgia

CHART OF RESPONSIBILITY 1965

Objective	Type Activity	State Station and Federal Agency
2. Continued	Inventorying of asexually propagated plants will be continued.	Regional Plant Introduction Station, Experiment, Georgia
	Evaluation of turf grasses.	Ala., Ark., Fla., N.C., Okla., Tex., Tenn.
	Evaluation of ornamental plants.	Ala., Fla., La., Okla., N.C., S.C., Tenn., Tex., Va., P.R., Miss., Ga.
	Evaluate introductions of the following species of agronomic crops as sources of new breeding lines or for commercial plantings in their present forms:	
	grain crops	
	corn	Ala., Fla., Ky., Puerto Rico,N.C.
	sorghum	N.C., Ga., Fla., Okla., Puerto Rico, Tex.
	small grain	Fla., Ga., N.C.
	sunflowers	Ark., Ga., N.C., Tex.
	forage crops	
	Trifolium repens	Ala., La., S.C.
	Trifolium spp.	Ala., Ky., Soil Conservation Service, N.C.
	Lespedeza cuneata	Ala., N.C., Soil Conservation Service
	Vicia spp.	Ala., Soil Conservation Service
	Phalaris spp.	Ala., N.C.
	Cynodon spp.	Ga., Fla., N.C., Tex., Okla.
	Paspalum spp.	Fla., Ga., La., N.C., Tex.
	Pennisetum spp.	N.C.

CHART OF RESPONSIBILITY 1965

Objective	Type Activity		State Station and Federal Agency
2. Continued.	forage crops, con't.		
		Bothriochloa spp. and _Andropogon_ spp.	Ala., Okla., N.C., Tex.
		millets and Misc. summer grasses	Ala., Fla., Ga., N.C., Miss., Texas, Puerto Rico.
		Alfalfa	N.C.
		Misc. summer legumes	Ala., Fla., Ga., La., Okla., N.C., Puerto Rico, Soil Conservation Service
		Arachis spp.	Ala., Fla., Ga., N.C., Okla., Tex., Va., Soil Conservation Service
		Tobacco	Fla., N.C.
		Cool season perennial grasses	Ark., Ky., N.C., Va.
	Evaluate introductions of the following horticultural crops:		
		Cantaloupe	Ark., Ala., S.C., Texas, N.C.
		Watermelon	Ark., Fla., Miss., S.C., Tex., Va., NC.
		Tomato	Ala., Fla., Texas, N.C., Miss.
		Pepper	Ala., Ga., S.C., N.C.

CHART OF RESPONSIBILITY 1965

Objective	Type Activity	State Station and Federal Agency
3. To provide plant and seed materials for assessments of their chemical and physical properties and industrial use potentials	Plant and seed material from increase and evaluation nurseries will be supplied for chemical and physical evaluation	Fla., Ga., Ky., La., N.C., Okla., Puerto Rico, S.C., Texas
4. To catalogue and distribute introduced plant materials and to maintain and publish records of their performance and use in the Southern Region.	A complete list of available introductions will be prepared for distribution to research workers. The following manuscript will be published:	Regional Plant Introduction Station, Experiment, Georgia
	Resistance of southern pea, *Vigna sinensis*, to Cowpea Chlorotic Mottle Virus. Proc. Amer. Soc. Hort. Sci.	
	Distribute seed lists and reports of new plant activities. Maintain records of new plant materials received within the state and report their performance and use to the S-9 Technical Committee.	S-9 Committee members representing each state station and the Soil Conservation Service.
	Prepare an annual report for the S-9 'New Plants' Project	Eli L. Whiteley, Chairman, S-9 Committee.

CHART OF RESPONSIBILITY 1965

Objective	Type Activity	State Station and Federal Agency
2. Continued.	Evaluation of horticultural crops, con't.	
	Southern pea	Ala., Fla., Ga., Miss., Okla., Tex.
	Fruits and nuts	Ala., Ark., Fla., Ga., Ky., La., Miss., N.C., Okla., Puerto Rico, S.C., Tenn., Tex., Va., NCRB, ARS
	Sweet potato	Ga., La., N.C., Okla.
	Other vegetables	Fla.,La.,N.C.,Puerto Rico.,Va.
	Strawberries	La., N.C., Tenn.
	Adaptation and cultural studies of the following:	
	Oilseed crops	Ala.,Ark.,Fla.,Ga.,N.C.,Okla., S.C.,Tex.,NCRB, ARS
	Fiber and pulp	Ala.,Fla.,Ga.,NC.,Okla.,S.C.,Tex., NCRB,ARS
	Gum crops	Ala.,Ark.,Fla.,Ga.,La.,N.C.,Okla., S.C.,Tex.,NCRB,ARS
	Drug crops	La.,Fla.,NCRB,ARS
	Crops for insecticides	S.C.,NCRB,ARS
	Chemical evaluation of new plant materials for new sources of oil, pulp and gums.	URDD, ARS
	Storage of pulp plant materials	Ga.