

MINUTES
of the
Meeting of the Technical Committee
Southern Regional Cooperative Project S-9, New Plants

National Seed Storage Laboratory
Colorado State University
Fort Collins, Colorado
August 3-4, 1959

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J. A. Martin, Chairman

The meeting of the S-9 Technical Committee was called to order by Chairman J. A. Martin at 8:50 a.m. August 3, 1959. Following is a list of those in attendance. Since Dr. Hugh Dempsey, secretary, was absent; the chairman requested Dr. W. E. Roever to serve as secretary at this meeting.

MEMBERS PRESENT

R. D. Lewis	Administrative Adviser, Texas
W. R. Langford	Regional Coordinator, Georgia
A. M. Davis	Dept. of Agronomy, U. of Arkansas
G. B. Killinger	Dept. of Agronomy, U. of Florida
Julian C. Miller	Dept. of Horticulture, LSU, Louisiana
Ralph S. Matlock	Dept. of Agronomy, Oklahoma State U., Oklahoma
Roy Woodbury	Dept. of Plant Breeding, U. of Puerto Rico
J. A. Martin	Dept. of Hort., Clemson College, South Carolina
William E. Roever	Dept. of Horticulture, U. of Tennessee
R. G. Reeves	Dept. of Genetics, Texas A. & M., Texas

U.S.D.A.

H. L. Hyland	New Crops Research Branch, ARS, Beltsville, Md.
I. A. Wolff	Northern Util. Res. & Dev. Div., ARS, Peoria, Ill.
Morris Byrd	Soil Conservation Service, Little Rock, Ark.
D. Y. Perkins	State Experiment Stations Div., ARS, Beltsville, Md.
Edwin James	National Seed Storage Laboratory, New Crops Res. Branch, ARS, Fort Collins, Colorado

OTHERS PRESENT

Ted Hymowitz	Dept. of Agronomy, Oklahoma State University
David A. Sander	Dept. of Agronomy, Oklahoma State University
S. S. Wheeler	Dean, College of Agriculture and Director of Agricultural Experiment Station, Ft. Collins

Proposed Agenda for S-9 Technical Committee Meeting
National Seed Storage Laboratory
Fort Collins, Colorado
August 3-4, 1959

1. Registration and Roll Call - 9:00 a.m. August 3, 1959.
2. Welcome - Edwin James.
3. The Agricultural Work in Colorado - Director Wheeler.
4. Function and Operations of National Seed Storage Laboratory - Edwin James.
5. Tour of Laboratory - Staff of National Seed Storage Laboratory.
6. Completion of agenda and appointment of committees.
7. Report of activities of S-9 Regional Station during 1958-59 - W. R. Langford.
8. State Reports on new crops research. Reports should include (a) progress of work to date and (b) plans for next year.
9. Progress Report on Screening Program at Northern Utilization Research and Development Division - I. A. Wolff.
10. New or revised contributing projects.
11. Reports from the New Crops Research Branch - Howard L. Hyland.
 - A. Plant Introduction Section
 - B. Crop Development Section
12. Review of April 1959 Meeting of National Coordinating Committee - R.D. Lewis.
13. Proposals for repositories to maintain asexually propagated plant materials.
14. Proposals for new plant explorations
 - (a) New germ plasm for sweet potatoes - J. C. Miller
 - (b) Domestic fruits along Gulf Coast - J. C. Miller
 - (c) Others
15. Ideas for encouraging use of new plant materials through academic programs.
16. Reports of subcommittees.
17. Plans for preparation of annual report for 1959.
18. Election of Executive Committee - Chairman
Secretary
19. Suggestions for next meeting - Place
Time

The agenda proposed for this meeting and distributed among committee members several weeks in advance was discussed briefly, then adopted with only minor changes in the order of topics to be discussed. Dr. James indicated that Dr. S. S. Wheeler, Director of the Colorado Agricultural Experiment Station, could not meet conveniently with the S-9 Committee during the morning. He suggested that Director Wheeler be given time to talk to the group during the afternoon. Dr. I. A. Wolff's progress report on screening new crops from a chemical standpoint was moved to the morning session.

WELCOME - Edwin James

Dr. Edwin James, Director of the National Seed Storage Laboratory and former coordinator of Project S-9, expressed his pleasure in seeing the group again and in its meeting at the Laboratory. He invited those in attendance to bring other members of their families and be his and Mrs. James' guests at a picnic supper on their lawn at 6:30 p.m. August 3. Members of the group who had not planned to leave Fort Collins immediately after the meeting adjourned were invited by Dr. James to tour the Rocky Mountain National Park Tuesday afternoon, August 4.

Agricultural Research in Colorado - Director S. S. Wheeler

Director Wheeler gave an interesting resume of Colorado agriculture and discussed the research program of the Colorado Agricultural Experiment Station. He described the soil and water resources of Colorado and stated that variation in altitude was largely responsible for the wide range in agriculture within the state. With the aid of a relief map he pointed out the location of each substation and experiment field and described the research work of each unit.

Appointment of Committees

The following were appointed by Chairman Martin to serve as a committee to nominate new members of the S-9 Executive Committee:

J. C. Miller, Chairman

R. G. Reeves

Roy Woodbury

They were instructed to make nominations for chairman and secretary for the coming year.

Function and Operation of the National Seed Storage Laboratory - Edwin James

Dr. James stated that the National Seed Storage Laboratory began operations July 1, 1958. However, the federal government has not legally accepted the building from the contractor because some equipment has not fulfilled specifications. He discussed the equipment and rooms for storing seed, then explained that the laboratory is not only a place for seed storage but also a research facility to study changes that occur in seed stored under various conditions. Plans have been made to study the relationship between respiration rate and longevity of seeds. Studies will be made on enzymatic changes and chromosomal aberrations that occur with age.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE

National Seed Storage Laboratory

Fort Collins, Colorado

STORAGE APPLICATION

Storage Location

Room _____ Rack _____ Drawer _____

From _____

Address _____

Kind of Seed _____ Origin _____

Amount Submitted _____

Botanical name _____

Agronomic or Horticultural variety _____

Synonyms _____

Your identification number _____

Other identification numbers _____

Crop year of seed _____ Your germination _____ Date of test _____

Mode of crop reproduction:

Self pollination _____ Cross pollination _____

Special storage requirements _____

Is the seed available in commercial channels? _____

Do you plan to maintain this variety or stock? _____ How long? _____

May other research men obtain this seed from you? _____

Can arrangement be made with your administration for the increase of new stocks in case of depleted stock or drop in viability? _____

Person and/or agency authorized to enter increase agreement:

Name _____ Position _____

Address _____

DOCUMENTATION

To be accepted by the National Seed Storage Laboratory seed must meet standards set up by the several crop group committees. In the space below give the Agronomic or Horticultural characteristics of this seed which justify their preservation in the Laboratory. If reference is made to this seed in scientific journals or other publications list as indicated any such citations.

Literature citations or test results.

Accepted _____
Director of Laboratory

Laboratory Accession No. _____

Serial No. _____

Discussion of the laboratory operations brought forth many questions from the group. Dr. Lewis stated that answers to most of the questions concerning the laboratory could be found in Dr. Whitehouse's Report on Policies and Procedures of the National Seed Storage Laboratory. This report as recorded on pages 43-47 of the minutes of the 1959 meeting of the National Coordinating Committee is given below.

National Seed Storage Laboratory Policies and Procedures by W. E. Whitehouse.

The National Seed Storage Laboratory was dedicated on December 5, 1958. Dr. Edwin James, Director, and Dr. L. N. Bass, Seed Physiologist, compose the Laboratory professional staff. The following broad policy statement on the use of the Laboratory as a national facility, based on the recommendations of a six-member advisory group, has been issued by the Crops Research Division, ARS.

"The Crops Research Division, ARS, has responsibility for the administration of the National Seed Storage Laboratory through its New Crops Research Branch. Dr. Edwin James, Director, and Dr. L. N. Bass, Seed Physiologist, compose the professional staff at the Laboratory.

"The Laboratory building is constructed on three levels. Refrigeration-dehumidification equipment, control instruments, a repair shop, a garage, general storage, and seed cleaning rooms are on ground level. Offices, library and file space are on the second level; seed-storage rooms and germination laboratory are on the third level. Nine of the storage rooms provide independently controlled temperatures ranging from 20 to 40 degrees F. and can be brought down to a relative humidity of 35 percent. A tenth and smaller room provides a controlled temperature range of 0 to 35 degrees F. at the same humidity level. A small low-temperature, high-humidity room provides a facility for germinating hard seeds by the stratification technique. The Laboratory's capacity can be indicated by the estimate that, if the average sample of seed stored was 1 quart, about 300,000 such containers could be held by the Laboratory.

"The Agricultural Research Service requested a 6-member advisory group to make recommendations on broad policies for the Laboratory as a national facility. The members of this group are D. W. Robertson (Colorado) and W. M. Meyers (Minnesota) representing State Experiment Stations; F. L. Winter (Assoc. Seed Growers, Inc.) representing the National Council of Commercial Plant Breeders; E. M. Page (Cornell Seed Co.) representing the American Seed Trade Association; H. A. Rodenhiser and C. O. Erlanson, representing the Agricultural Research Service. The statements and recommendations made by this group and listed below have been accepted as general policy by the Agricultural Research Service.

1. The Laboratory is a federal facility and all seed accepted for storage becomes federal property.
2. Only seed will be accepted for storage.

3. Valuable seed stocks will be accepted from federal, state and private institutions and individuals. The basic criterion of acceptability will be its value as germ-plasm for future use and comparison. Documentation as to value will be required, along with other information as to source and developmental history.
4. Any bonafide research worker of the United States, its territories or possessions may receive seed from collections stored at the Laboratory. However, seed will not be issued if readily available elsewhere.
5. The Laboratory will have no responsibility in relation to commitments with foreign countries. All requests from foreign sources will be channeled to headquarters of the New Crops Research Branch at Beltsville, Md., where decisions in relation to foreign countries will be made.
6. A series of crop-group informal committees will be established by the Agricultural Research Service to advise the Laboratory Director as to valuable stocks to be held, sources when known, proper documentation, and to expedite the movement of these stocks to the Laboratory. These committees will work directly with the Laboratory. The responsibility for acceptance of seed lies with the Laboratory Director or his superiors and the committees will not be expected to screen stocks for the Laboratory.
7. No seed will be held by the Laboratory for the exclusive use of one or more agencies, organizations or individuals. Once accepted by the Laboratory, the seed will be available to any research worker subject to such limitations as are here laid down.
8. The Laboratory will not be a procurement agency for seed. The Laboratory will only furnish seed from stocks it is holding.
9. The Laboratory is not a warehouse or seed distributing center. The Laboratory will not hold bulk supplies or seasonal stocks. Rather, it is a germ-plasm bank for valuable stocks to be held over the years for the use of research workers when needed.
10. The Laboratory will issue periodic inventories of the stocks held in storage to inform research workers of material available.
11. The Laboratory will be responsible for the rejuvenation or replenishment of seed stocks held.
12. No charge will be made by the Laboratory for the service of furnishing seed. The Laboratory will use every care in keeping good records but is not responsible for errors which may occur in the documentation.
13. Fresh clean seed is one criterion of acceptability by the Laboratory. Periodic germination tests will be made as considered necessary.

14. The principal objective of the Laboratory is long-time holding of valuable seed. Research projects will be carried on at the Laboratory related to the Laboratory's objective, i. e., physiological problems in seed viability and longevity."

The performance tests on storage and laboratory equipment are now underway to insure efficient operation of the Laboratory in anticipation of the near arrival of a steady stream of seed stocks. The crop group committees set up by the Crops Research Division are at present working closely with Dr. James, setting up standards for his use in deciding on seed stock categories acceptable for preservation at the Laboratory.

For example, world collections of barley, oats, wheat, and rice consisting of 30,000 items are maintained by the Cereal Crops Research Branch at Beltsville and other locations. These are working collections. The crop group committee on small grains has recommended that documented lists of seed in these world collections be made available to the Laboratory. The following recommendation of this committee covering wheat, oats, barley, and rice was specific enough to enable Dr. James to start sending out some application forms for storage of grains a month ago.

- "1. Acceptable varieties:

Registered varieties or varieties grown commercially should be accepted for storage.

- "2. Acceptable genetic stocks:

Insofar as possible, genetic stocks should be homozygous and of known genetic usefulness. Stocks requiring genes to be carried in a heterozygous condition e.g. albino seedling, should be so indicated. Parental stocks used in specific genetic experiments possessing known genes, and stocks possessing special combinations of genes should be included. Wild or non-cultivated species of Triticum, Avena, Hordeum and Oryza and closely related genera are acceptable.

- "3. Quantities of seed for storage:

For varieties, 300 grams of seed is suggested as a minimum quantity. For genetic stocks 500 seeds is suggested as the minimum. It often is difficult to obtain seed in quantity from genetic stocks especially wild species, and these should not be excluded from storage merely because they are poor seed producers. If indicator lots are used for germination tests as indicated below, 500 seeds should be sufficient. In most cases quantities greater than 500 seeds will be available for storage.

- "4. Germination Tests:

It should not be necessary to run germination tests on varieties

each year. 'Indicator' lots comprising 5 or 10% of the collection could be germinated after 5 years storage and more frequently thereafter.

For genetic stocks 'indicator' lots also could be used or germination tests could be run on each lot of seed every 2 or 3 years using as few as 10 seeds for the test. Certain genetic stocks, particularly the wild species, will be designated as 'storage sensitive', and these could be germinated in alternate years using 10 seeds for the test."

The crop group committee report on policies for acceptance of cotton points out that there is a system for collection and maintenance of valuable cotton germ plasm. Under Region S-1 project, Genetics and the Improvement of Cotton, responsibility for these collections is assigned to state and federal stations in Mississippi, Texas, Arizona, and New Mexico. Those in Mississippi and Texas have been in existence for about 12 years, but Arizona and New Mexico collections are of recent establishment. Seed rejuvenation is done on a 5-year cycle. Cottonseed can be stored 20 years or more under controlled conditions. The cotton research workers hope the National Seed Storage can be used to add considerably to the over-all security and efficiency of cottonseed maintenance. It is estimated that around 1500 cotton stocks are ready for storage at the Laboratory now and an additional 500 will become available over the next 10 years.

Dr. James is receiving this same type of report from the other crop group committees.

Crop Development Section program leaders have suggested lists of plant introductions for storage. As an example, the Forage Crops Advisory Committee reports the name or accession number of 280 grass strains and varieties that are now being evaluated in field test plantings throughout the United States. More than half of the items under test are named varieties obtained from commercial sources or crop improvement programs. Approximately 50 items were obtained as direct plant introductions whereas a lesser number of accessions were derived as selections from the native vegetation in different parts of the United States. Similar research information is available for forage legumes. Dr. Hoover suggests that the Forage Crop Committee select from these available forage grasses and legumes those items that should be permanently maintained and preserved.

Upon receipt of this same type of report from the other crop group committees, Dr. James will be in position to send out applications for storage of seed of other crop plants."

The question arose as to who makes the decision regarding acceptance of seed for storage. Dr. James quoted the following statement by Dr. C. O. Erlanson, Chief, New Crops Research Branch, ARS:

"The responsibility for acceptance of all seed coming to the Laboratory lies with the Director of the Laboratory. The policies upon which the Director will be guided in this responsibility will be laid down by his

superiors in the Agricultural Research Service, New Crops Research Branch.

"General policy recommendations have been made to the Agricultural Research Service by the group appointed by ARS to assist ARS in formulating a policy best suited to all interested parties. Informal crop-group committees will be gradually developed to assist the Director in determining what might be valuable to hold in various crop groups. These crop-group committees will be of great value in creating a flow of valuable, well-documented stocks, coming to the Laboratory. The crop-group committees, or their chairmen, will be helpful to the Director in making decisions where necessary, but these crop-group committees will have no responsibility for acceptance in the Laboratory of seed which may be recommended. This responsibility lies entirely with the Director and his superiors. The crop-group committees will not be expected to pass on the acceptability of seed, but can be expected to give advice to the Director as needed."

Other questions and comments about the Laboratory were as follows:

- Miller: Should seed of a new variety be entered?
- James: Every new variety should be represented in the Laboratory, preferably with foundation seed. One valuable genetic character is enough to justify request for storage. An individual is expected to store his own working seed stocks. Purpose of the Laboratory is to perpetuate and make seed stocks available to others.
- Killinger: Has there been widespread use of seed storage facilities thus far?
- James: Dr. James expressed disappointment in lack of response of certain groups. Federal workers have shown a keen interest but State College employees have not shown an active interest.
- Martin: Suggested that every plant breeder in the southern region be acquainted with the National Seed Storage Laboratory and its functions.

Progress Report on New Crops Screening Program at Northern Utilization Research and Development Division - I. A. Wolff

Dr. Wolff presented the background and philosophy of the New Crops screening program. He pointed out that more than 250,000 plant species are known, but less than one-tenth of one percent of them have been brought into economic use in the United States. The chemical composition of most species is unknown. More of them should be studied. Therefore, with limited manpower and facilities, emphasis has been placed on the study of new species rather than on finding new germ plasma for improving established crops. Greatest effort goes into screening plants for industrial use rather than crops for food, feed,

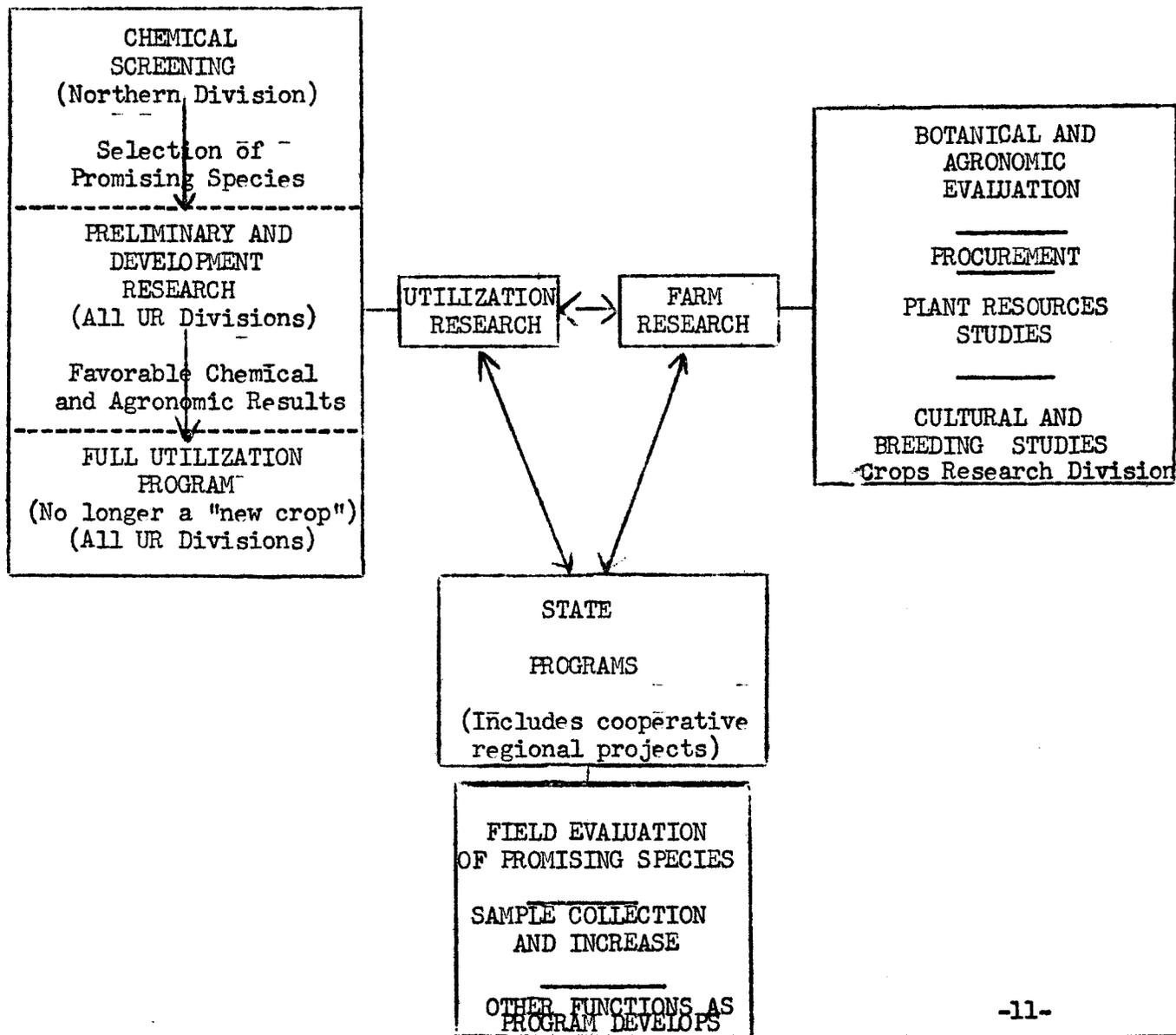
forage or pharmaceutical uses. Emphasis in the screening program is placed on major constituents so that if successful, a substantial acreage would be involved.

Objectives considered in the screening program are:

1. Vegetable oils - useful in industry but traditional uses declining - chemically new oils required.
2. Pulp fiber plants - good market. (32,000,000 tons of paper used annually in U.S.)
3. Carbohydrates - non-starch polysaccharides needed.
4. Proteins - most limited basic information about composition available.

Dr. Wolff stated that the Utilization Research Program had been in active operation only 2 to 3 years. It is of necessity a cooperative program and is organized as shown in the following diagram.

Figure 1. New Crops Program Organization



Dr. Wolff urged close cooperation between chemical evaluation and crop production personnel so that the industrial value and required cultural practices of a new crop can be determined simultaneously.

A total of 1,778 seed samples representing 119 families, 545 genera, and 1,010 species have been studied. 1,467 have been screened chemically, giving results as follows:

532 samples representing 392 species contained more than 20% oil.

102 samples representing 85 species contained more than 40% oil.

256 samples representing 189 species contained more than 60% oil and protein.

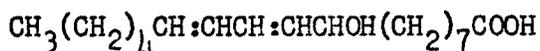
236 samples showed no starch, low oil and protein. Eighty eight species within this group were screened for seed mucilage content, and 12 had as much or more than guar.

A total of 706 samples have been screened for pulp fiber. These represent 46 botanical families, 274 genera, 349 species. 279 samples were screened using a composite rating procedure involving chemical composition, fiber dimensions, fiber yield, and botanical evaluation of crop potential. Nine genera have been quite promising, with grass family, mallow family, legume family, and spurge family apparently the best. More detailed pulping studies are required on these samples. Forty seven genera were inferior to those above on basis of screening tests.

Figure 3. Oil Composition Research

<u>Unusual Characteristics Sought</u>	<u>Results</u>
1. Oxygen functions	1. Hydroxy, conjugated dienes (<i>Dimorphothea aurantiaca</i>)
2. Type of unsaturation	2. Conjugated trienes (Tung & Other Oil Seeds)
3. Combinations of 1 and 2	3. Epoxy acid oils (Plasticizers from veg. oils)
4. Chain length	4. Erucic acid oils (Rape, radish & mustard)
5. Iodine value	5. Petroselinic acid oils (Umbelliferae)

Examples



DIMORPHECOLIC ACID----*Dimorphothea aurantiaca*



CORONARIC ACID----*Chrysanthemum coronarium*

Figure 4. Where do we go from here?

Successful new crops development is long range and requires continuing interest and efforts of many groups. With sustained, cooperative programs ultimate benefit to agriculture will result.

Interested agronomists and breeders should follow leads from new crop screening programs and actively seek in various regions and climates to develop cultural conditions which can be used for successfully making a crop from presently uncultivated plants.

NU, working through CR, will be happy to cooperate with S-9 and other regional committees in furthering new crops research. Suggestions on any phases of our screening program will be welcomed.

Matlock: Will names of the 12 items that had as much or more mucilage as guar be available?

Wolff: Yes.

James: Did Pennisetum spicatum have any fiber value?

Wolff: Ratio of leaf to stem was too high. Of some 50 sorghums sent from Texas, one or two were quite good. Sesbania sonoriae was near the top in pulping potential. There is also an interest in okra.

J. Miller: Arthur D. Little Co., Staley Starch and Corn Products are interested in okra. The Little Co. at Lafayette, La. is interested in it for mucilage. This is present, in the green stage, in leaves as well as pods. Okra oil also contains an anti-oxidant.

R. G. Reeves: In tests of different samples of the same species, is content always the same?

Wolff: In Daucus carota there is a two-fold variation in protein content. There is more likelihood of variation in amount than in type. Seeding of a crop where it normally grows is not necessarily required. In fact, it may do better grown elsewhere.

Lewis: Is bamboo still in the pulp picture?

Wolff: Yes, as a fiber base, newsprint, etc.

Martin: It will be 3 or 4 years before our 100-acre planting will be ready to sample.

Hyland: The effects of cultural methods on the quantity of the valuable constituent content are studied later.

Lewis: Some of the most promising crops are small-seeded.

- Wolff: A second Dimorphotheca species has much larger seed than D. aurantiaca.
- Lewis: Several states in the South are trying to see if some of these crops can be grown. There is not much luck in some cases. It's a very big job agronomically or horticulturally after a crop is proven in the laboratory--such matters as how it grows, how it is best grown, market establishment. The chances are small and extensive effort is required. Ours is a deliberate effort to increase the chances.
- Miller: A new crop, for example castor beans, must be made attractive to the farmer. He may need to be subsidized at first.
- Lewis: Irrigation seems needed for this crop.
- Matlock: Industry has taken over much of the burden in pushing castor beans.
- Wolff: I believe Dimorphotheca might be even more promising than castor bean.
- Lewis: Five out of six potential new crops chosen by the Task Group on New and Special Crops are adapted to the South.

Tour of Laboratory - Edwin James

The Laboratory building is constructed on three levels. Refrigeration-dehumidification equipment, control instruments, a repair shop, a garage, general storage, and seed cleaning rooms are on ground level. Offices, library and file space are on the second level; seed-storage rooms and germination laboratory are on the third level. Nine of the storage rooms provide independently controlled temperatures ranging from 20 to 40 degrees F. and can be brought down to a relative humidity of 35 percent. A tenth and smaller room provides a controlled temperature range of 0 to 35 degrees F. at the same humidity level. A small low-temperature, high-humidity room provides a facility for germinating hard seeds by the stratification technique. The Laboratory's capacity can be indicated by the estimate that, if the average sample of seed stored was 1 quart, about 300,000 such containers could be held by the Laboratory.

In addition to the storage facilities, some of the equipment seen for handling seed included:

1. Precision sample divider
2. General seed blower
3. Stultz water curtain type germinator
4. A "James Model" fumigation chamber
5. Vitascope for seed viability determinations
6. Haldane apparatus for studies in respiration

7. Vacuum seed counters
8. Swedish make seed cleaner consisting of 5 parts:
 - (a) dehuller
 - (b) airblast cleaner
 - (c) screen cleaner
 - (d) gravity separator
 - (e) indent-cylinder separator

S-9 Regional Station Report - W. R. Langford

First, I should like to comment on the personnel changes at the regional station. Dr. Grover Sowell joined the station staff last December as Plant Pathologist. Since that time he has been screening pepper introductions for resistance to bacterial blight and melons for resistance to gummy stem rot. In addition to this, he has spent considerable time this summer taking notes and identifying diseases that occur in our nursery plantings. Dr. Sowell is an employee of the New Crops Research Branch of ARS. Before coming to the regional station he spent about four years working with diseases of horticultural crops at the Gulf Coast Experiment Station in Florida.

Mr. John Massey is still on leave, working for his doctorate at LSU. His leave will expire in February, and he is expected to return to the station as assistant agronomist. Mr. W. L. Corley has been working as a temporary replacement for Mr. Massey while he is on leave. However, Director Fullilove has agreed to keep both on the staff, and the budget for this year is set up with that in mind.

A summary of the introductions handled by the regional station during the last fiscal year is shown in Table 1.

Table 1. Introductions Processed by Southern Regional Plant Introduction Station July 1, 1958-June 30, 1959

New introductions received	1548
Number grown at regional station	2578
Number grown under contract	333
Number catalogued	742
Seed packets distributed within region	7365
Total received since 1949	15835
Number in storage	9484

Between July 1, 1958 and June 30, 1959 we received 1,548 new accessions. This is considerably more than was received during the previous year, and some

greater than during any year since 1955. We planted 651 introductions last fall in the winter nursery, and there are 1,927 in our present summer nursery, making a total of 2,578 accessions grown for increase and evaluation. In addition to those grown at the regional station, 333 are being evaluated under contract this summer. These include sorghum, sesame, peanuts, pepper, and okra.

Catalogues containing 742 introductions not previously catalogued have been distributed. These were from the summer nursery last year. We hope to distribute within the next two weeks catalogues of material grown in the winter nursery.

A total of 7,365 seed packets and plants were distributed within the southern region. About two-thirds of these were sent from the regional station and the remainder were ornamental and fruit plants distributed by the Federal Plant Introduction Stations at Miami and Glenn Dale.

Since the regional station was established in 1949, it has received 15,835 introductions. Some of these have been transferred to other regions and others were lost because they failed to produce seed under our conditions. We now have in storage seed of 9,484 accessions. These have been indexed on the McBee punch cards that Dr. James explained last year.

Introductions that looked promising in our winter nursery include Ronphagrass, P.I. 233707, Trifolium vesiculosum, P.I. 234310, and Trifolium balense, P.I. 201209. Ronphagrass appeared to be much more productive than any of the other Phalaris introductions. It makes an abundance of seed heads but no viable seed. Trifolium vesiculosum is a winter annual with growth cycle similar to that of crimson clover. P.I. 234310 matures a little later than crimson clover. Two other accessions of this species are three to four weeks later than P.I. 234310, but appeared to be just as productive.

Trifolium balense P.I. 201209 was catalogued several years ago, but re-increase plots of it in our nursery last winter appeared quite productive.

Major purchases made at the regional station last year include:

1. Construction of a new cold room for seed storage.
(This was paid for by a special allocation of \$3000 by the Georgia Experiment Station).
2. Addition of three bays to the greenhouse.
3. A Contaflex camera with set of portra lenses.
4. One-half interest in a new mimeographing machine.
5. A three-foot sickle bar mower.
6. Construction of a moist chamber for inoculating plants.

The addition to the greenhouse provides 575 square feet of space for the pathologist to use in screening introductions for disease resistance. This

section of the greenhouse is equipped with an automatic watering system.

The cold room is constructed in headhouse space once used for garage. It has a volume of 2,000 cubic feet and will provide space for our present stocks and incoming seed for the next 12 to 15 years.

Table 2 is a financial statement of funds used last year and those available for this year's operations.

Table 2. Financial Statement Southern Regional Plant Introduction Station

Source of Funds	1958-59	1959-60
Regional Research Funds	\$22,000	\$22,000
USDA - (L.A. & Salaries)	10,148	15,315
State	<u>5,000</u>	<u>2,600</u>
Total	\$37,148	\$39,915

Expenditures	1958-59	1959-60 (Proposed)
Capital Outlay	\$ 6,505.64	\$ 2,494
Operating Expenses	3,557.40	3,500
Personal Services	26,475.64	33,121
Travel	<u>457.34</u>	<u>800</u>
Total	\$36,996.02	\$39,915

In 1958-59 we received a total of \$37,148. \$22,000 of this was Regional Research Funds. \$10,148 was from the New Crops Research Branch of ARS for salaries and L.A. The Georgia Experiment Station contributed \$5,000 which included the \$3,000 special allocation for the cold room construction.

Expenditures for capital outlay amounted to \$6,505.64. Major items in this category were the cold room at a cost of \$3,000; and the greenhouse which cost \$2,100. Operating expenses were \$3,557, personal services \$26,475.64, and travel cost \$457.

We have available for this year's operation \$39,915. Twenty-two thousand dollars will come from Regional Research Funds, \$15,315 from the New Crops Research Branch, and \$2,600 from State funds.

Most of this will go for salaries and personal services. We have set up \$800 for travel, \$3,500 for operating supplies, and considerably less than in previous years for capital outlay. However, I don't anticipate any major capital expenditures. The greatest will be a heating system for the greenhouse addition.

- Killinger: There have been reports in Florida that Ronphagrass may be poisonous. Do you have any information on possible toxic effects of this grass?
- Langford: No, I have not heard of its being toxic.
- Langford: Reported that Dr. Norman Taylor in Kentucky has offered to evaluate and increase under contract all introductions of Trifolium.
- Killinger: John Edwardson will evaluate all accessions of lupine and return increase seed of each to the regional station.
- Langford: There may be considerable money involved in contract work. Perhaps the Committee should decide whether or not contract evaluation should be increased.
- James: Stated that the Technical Committee several years ago gave the coordinator authority to enter into such contracts. The decision on new contracts rests with Langford.
- Hyland: Suggested that the Kentucky request be brought to the attention of Dr. Hoover since he is responsible for distributing Dr. Gentry's recent clover collection.
- Lewis: Suggested that someone farther south than Kentucky should also be evaluating clover introductions

S T A T E R E P O R T S

ALABAMA - Submitted by Dr. C. S. Hoveland, read by W. R. Langford

A total of 161 new plant accessions were received in Alabama during the past year. Most of these plants were forage grasses and legumes. The majority of these accessions were received this spring and it is too soon to place an evaluation on them.

Certain introductions made in previous years show promise in Alabama. Crotalaria intermedia (PI 239,485) made a high yield and is worthy of further testing. Contrary to previous reports, a few plants wilted severely, then died, and showed signs of nematode infection.

Two accessions of Desmodium (PI 225,890 and PI 214,158) reached a height of 6 to 7 feet and produced large woody stems that might be used for paper pulp. Other accessions of Desmodium tested appeared to have little or no value as a forage crop.

Only two accessions of Indigofera (PI 226,540 and 231,147) appeared worthy of further evaluation. Both of these made satisfactory yields with the former number being the most productive.

Ronphagrass (PI 233,707) looks very promising as a winter perennial grass. Observational rows at Auburn have given much higher forage yields than Auburn reed canary or hardinggrass. During rainy weather in early June, the leaves of Ronpha were badly infested with tawny blotch (Stagonospora foliicola), a fungus causing brown to wine-colored lesions. In spite of this problem, the plants remained vigorous and productive. Further tests with Ronpha will be started this fall at several locations in Alabama. Erucastrum abyssinica (PI 243,913) made excellent, rapid growth this spring and summer. The plants achieved a height of four feet and were exceptionally leafy. Its vigor suggests that it might be useful as a temporary grazing crop.

All of the buffelgrass accessions (PI 240,169-171, 243,198-199, 245,375) have made rapid growth and look very good at this time. PI 243,198 and 243,199 look especially productive.

Horticultural plant accessions acquired the past year are still under test and it will require another year before evaluations are completed.

ARKANSAS - A. M. Davis

The Arkansas Agricultural Experiment Station received 89 plant introductions during the past year, 69 of which were grasses, 11 Citrullus, and 9 Solanum. In addition to these, 16 lawn-type Bermuda grasses were received from the USDA in Beltsville.

PI 224,146 is a fine medium green Bermuda grass that has looked particularly good for two years. A small increase has been made for further evaluation. It has been free of Rhizoctonia and rust--two diseases that are a problem on Sunturf and common Bermuda in Arkansas.

Two other interesting plant introductions are 220969 and 211022. PI 220969, Sorghum sudanense is a perennial plant with short rhizomes and good vigor. The seed color is red. Breeder sudan grass planted in four hills around this plant are severely infected with Helminthosporium while PI 220969 appears to possess considerable resistance. It has been turned over to the forage sorghum breeder for further evaluation and use. PI 211022, a seed producing Bermuda grass, has a growth habit similar to Midland with considerably more runner development. It is winter-hardy and looks promising. It is now undergoing pathological study as to Helminthosporium, smut and Rhizoctonia susceptibility.

Lolium rigidum PI 239730-47 and 239775-76 made good fall growth but winter-killed 98%+ and must be considered failures. Some lines from Sesamum PI 158901 are being purified and may be of value in the future.

FLORIDA - G. B. Killinger

Many seeds and plants were introduced through the Southern Regional Plant Introduction Station during the 1958-59 season with a lesser number from the U.S.D.A. at Beltsville and other sources. In all over 2,100 accessions were

received by personnel of the Experiment Station, U. S. Government, Florida Health Service and private individuals during the year.

Peppers, sesame, castor beans and grass species made up the bulk of introductions with forage legumes, drug plants, ornamentals and other horticultural species introduced in lesser numbers.

All available Digitarias and sesame strains were placed on trial for evaluation and breeding programs.

Buffelgrass strains PI 243198 Chipinga and PI 243199 Grassland were outstanding in yield, leafiness, earliness and vigor as compared to commercial and other strains.

Trifolium vesiculosum PI 233782 and PI 233816 from Australia and Italy appeared identical and made sufficient growth to be given further trials even though this clover has behaved as an annual for two seasons.

Bermuda grass PI 224152 shows considerable promise at the Range Cattle Station, Ona, Florida as reported by Drs. Hodges and McCaleb.

Dr. Denes K. Markers reporting for the Public Health Research Laboratories at Stuart, Florida states that out of 10 Capsicum frutescens, sweet spice pepper, (paprika) plant introductions five were re-evaluated in 1957-58. These peppers were grown under hydroponic culture in an effort to find a variety adapted to such conditions from a growth and production standpoint. All introductions were susceptible to the so-called Mosaic Complex, however, their growth and yield were superior to the California Wonder Variety which was used as a tester. The same experiments will be re-run during the 1959-60 season.

Out of 25 Capsicum frutescens accessions tested by Dr. Robert Stall of the Indian River Field Laboratory, Fort Pierce, Florida none were resistant to phytophthora blight (Phytophthora capsici Leonian).

Dr. A. A. Cook reports no Cucurbit species received through the Regional Plant Introduction Station were resistant to Mycosphaerella melonis.

Because of several periods of intensive rainfall during the 1958-59 season many of the grass and legume introductions at Gainesville were washed out or covered with soil due to excessive erosion. The plant introduction nursery at Gainesville, used primarily for pasture plant species is in the process of being relocated. A greenhouse and irrigation system is planned for the new area which should allow for more accurate evaluations in the future.

Staff members in Florida have requested that all Lupine, Digitaria and Paspalum species available be screened for direct use or for breeding and that future plant exploration parties be instructed to collect as many types, strains or species of these plants as possible.

Further testing of accessions of peppers, lupines, grasses, legumes and other species or plant types will be conducted in an attempt to find a new and improved variety of an already existing crop or of a new crop not in use, or for use in breeding programs for crop improvement.

GEORGIA - Submitted by Dr. A. H. Dempsey, read by W. R. Langford

During the 1958-59 year workers in Georgia obtained a total of 924 introductions. About 80% of these were agronomic crops and the others were fruits, vegetables, and ornamentals.

The Agronomy Department of the Georgia Experiment Station obtained the entire sorghum collection for evaluation. PI 156549, Sorghum arundinaceum, has been used as a parent in developing a male sterile Sudangrass. Dr. Julian Craigmiles of the Georgia Experiment Station transferred male sterile genes from combine Kafir 60 sorghum to the above plant introduction. This characteristic has been stabilized in the Sudangrass from Rhodesia by backcrossing several times to combine Kafir 60. Dr. Craigmiles is now using this male sterile introduction to develop hybrid varieties of Sudangrass. This was reported in the Jour. of American Soc. of Agron. Vol. 50:714-715, 1958.

Screening of peanut introductions continues at Tifton. PI 121070, Arachis hypogaea, a selection from this introduction has been added to the list of peanut varieties recommended for certification and production in Georgia. According to Dr. Ray O. Hammons, Georgia Coastal Plain Station, this selection has been the highest yielding variety of Spanish-type peanuts tested in Georgia during the last three years. Georgia Experiment Station publications announcing release of this variety are not yet available but it has been publicized in newspapers. The attached news item was taken from the June 29 issue of the Atlanta Constitution.

KENTUCKY - Submitted by Dr. E. N. Fergus, read by J. A. Martin

Approximately 300 items were brought into Kentucky since June 1, 1958 under the "New Plants" project. Somewhat more than two-thirds of these items were miscellaneous woody plants, two were Zea mays, 27 consisted of 13 species of Trifolium, 11 consisted of two species of Sesamum, one was Cucumis melo, and 28 were Capsicum frutescens. Studies of few, if any, of these items have been completed. One significant accomplishment has been the successful hybridization of induced tetraploids of Trifolium diffusum and Trifolium pratense. These hybrids are fertile and so are their backcrosses to both parents. These results encourage studies of breeding programs with Trifolium pratense based on interspecies hybridization.

Explorations for genotypes of Kentucky bluegrass have been made in Kentucky and other southern states in recent years. A comparative study of these and genotypes secured by growing plants from commercial seed shows that exploring for source breeding materials of Kentucky bluegrass is the more effective procedure to screen superior genotypes of this species.

Work at the Kentucky Station will continue next year along the lines of previous years. It is expected that the studies of Trifolium species hybridization will be enlarged. It is also anticipated that increasing attention will be given to new accessions of ornamentals.

Progress of Work and Principal Accomplishments:

1. Okra: In using introduced material it usually takes from 8 to 10 years from the time a cross is made until a selection is ready for release and to use it effectively in a breeding program with most crops. In our breeding program with okra, we introduced a line from the Gold Coast of Africa about 1940. This year we are releasing a variety in which the Gold Coast was one of the parents. We have named the variety Gold Coast. The new variety has a dwarf plant and short, dark green pods. It is very resistant to heat and fruits over a long period of time. It is excellent for processing and for freezing.

2. Sweet Potato: We are using sweet potato introductions to breed for wilt, internal cork, soil rot and other diseases. We obtained some of the introductions from Cuba and other Caribbean areas and the Tinian Islands (PI 153655). This spring we received 19 new lines from New Zealand, Italy, Formosa, Congo, Peru, Ecuador, Brazil and Argentina. These lines are being studied to determine if they contain new germ plasm that will add to our parental material.

Previous introductions have meant the success of our sweet potato breeding program, for example, line 1-80 is resistant to three diseases, namely, internal cork, wilt and soil rot and has three times the carotene of the old standard Unit I Porto Rico. There are still several important areas that have not been explored for important stocks which might carry the characters for shape, interior and exterior color and resistance to certain diseases.

3. Pepper: This season we are growing some 85 different lines of pepper. They are being screened for etch virus which has threatened our Tabasco industry. We are now in the process of screening and using the resistant lines in our breeding program in order to obtain resistance to this disease.

We have also found a number of local lines, for example one that we have designated as Harper, which have most of the characteristics of the Tabasco, that is, upright, wax colored pod when immature, gradually turning red upon maturing. This is the type that we need in order to maintain these characters, as well as maintaining the pungent character.

4. Dioscoreas: We are continuing to receive various lines of Dioscorea from all parts of the world which are being sent to us by the Plant Introduction Service. These lines are being grown and tested for production and possible breeding types, and samples are sent to the Eastern Research Laboratory for analysis. We have just recently obtained from the Plant Introduction Service about 10 new lines that have a high cortisone content. These lines are being carefully grown and will be used in connection with the breeding for high potency.

5. Castor Bean: We are maintaining and selecting further for large seed, high yield and dwarf plant. This is a crop that offers possibilities particularly in the dry and semi-dry area of the South and Southwest. The oil is in demand by industry.

6. Irish Potato: We have introduced frost resistant varieties through the Plant Introduction Station at Sturgeon Bay, which have withstood temperatures as low as 25° F. at Baton Rouge. We are crossing these introductions with our breeding lines and our present populations are now in the F₂ and F₃.

7. Strawberry: We have used introduced varieties of strawberry from Holland and some of the other European countries for breeding for resistance to virus and for size. It is too early to predict the outcome of these crosses.

8. Israel Sweet Clover: Israel sweet clover continues to offer promise. Plantings made by C. R. Owen of the Agronomy Department grew to a height of 8 feet or more, and he reported that the planting produced seed sufficient for reseeding and offers possibilities since it produced as much as 15 tons of green material per acre. No reports were obtained from other department cooperating with this project at this time.

Usefulness of Findings:

1. Okra: The new Gold Coast variety will be a great contribution not only to the fresh market but also to the processors. Since it withstands more heat and has a dwarf plant with a short, green pod, it is finding ready acceptance. There are new commercial aspects of okra now in the process of research which will greatly expand the planting of this important crop, and products made from okra will replace many of the imported gums or mucilage which are greatly in demand by industry and food processors.

2. Sweet Potato: A variety which is resistant to wilt, soil rot and internal cork and is three times as rich in carotene as the Unit I Porto Rico will mean a great deal to the industry. Our new seedling 1-80, which meets the above requirements, is being grown extensively this season. The 1-80 is unusual in that it is resistant to all three diseases mentioned; however, the Acadian, a recently introduced variety which carries resistance primarily to soil rot, has filled a need in the Leonville-Arnaudville area where the soil pH is about 6.5 to 7.0 and is very subject to soil rot. Another Louisiana introduction, the Goldrush variety, is resistant to fusarium wilt, a disease which is prevalent in all of the northern part of Louisiana and most of the South. It has made a great contribution to the canning industry and more than 60 percent of the canned sweet potatoes in Louisiana are now of the Goldrush variety. Introduced parental material has played an important part in breeding the varieties resistant to the diseases mentioned.

3. Pepper: A high-yielding variety of pepper with high pungency and disease resistance will mean a great deal to the Louisiana pepper industry, which is now threatened by the etch virus. Probably more hot peppers of the Sport, Cayenne and Tabasco types are grown in Louisiana than any other southern state.

4. Dioscoreas: If the Dioscoreas could be grown in the Continental United States, it would add a new specialty crop, and practically all of the pharmaceutical houses are anxious to have this material produced in this country. We are testing a large number of lines and having them analyzed at the Eastern Research Laboratory, and we will make an effort to cross the varieties having the highest saponin content.

5. Castor Bean: The castor bean research has already made its contribution with the release of the Dawn variety by the Texas station and the U.S.D.A. A greater contribution will be made when the variety that we have at present is ready for release in that it is higher yielding and has larger seed than the Dawn. The oil can be used in manufacturing many products and is not in competition with other oil bearing plants.

6. Irish Potato: Two years out of five we obtain frost damage in the Gulf Coast area and a frost-resistant variety of Irish potato, which will withstand temperatures as low as 25 degrees, will mean a great saving to the farmers.

7. Strawberry: It is too early to predict the outcome of the crosses made with the introduced material.

8. Israel Sweet Clover: This clover, which is more vegetative than any other winter cover crop grown at present, should fill a need for a winter and spring cover crop.

Work Planned For Next Year

We will continue to use the introduced lines in the breeding program and make selections for desired characters. We will also continue to look for germ plasm which will mean more to the economy of this country.

Publications Issued or Manuscripts Prepared During the Year

Mimeographed Circular 41. Summary Report - Sweet Potato Breeding and Yield Studies for 1958.

Mimeographed Circular 42. Summary Report - Irish Potato Breeding and Development Project for 1958.

Circular No. 57. Gold Coast - A New Variety of Okra. June 1959.

NORTH CAROLINA - Submitted by Dr. Wm. T. Fike, read by W. R. Langford

Practically all plant breeding projects in various departments at North Carolina State College are testing and incorporating genes from numerous plant introductions into their breeding programs. Vegetable breeders are primarily looking for genes giving resistance to disease and those for improving quality. Cucumbers, squash, tomatoes, watermelons, and beans are a few of the crops where plant introductions are being used extensively. Several watermelon introductions were tested for resistance to Race 2 of Colletotrichum algemarum, and a number of snapbean introductions were tested for susceptibility to the cyst nematode of soybeans. All were susceptible. A number of cucumber introductions are being screened by the plant pathologist. Work on a tomato introduction with resistance to mosaic is being checked for linkage with other genes in the species. Forage crop breeders have a vast program containing many plant introductions. Sorghum breeders report finding some resistance to witch weed among the 171 introductions now being tested.

Dr. W. C. Gregory has returned from a collecting trip to South America with many new introductions of Arachis species.

Many crops partially established in other areas such as castor beans, sesame, bamboo, safflower, sunflower, and guar are being tested. Certain varieties of castor bean and sesame yield well, but all varieties of safflower have been wiped out due to disease, apparently Cercospora leaf spot before seed formation has taken place. Sunflower varieties yield well and a few farmers are trying them on a small scale. Results are not yet available on present guar varieties, except that five introductions were tested in 1958 and were heavily infested with Southern root rot. Introduction No. 158118 seemed to be the least injured.

Yields from the growth of the 11 genera grown in cooperation with the New Crops Research Branch were very poor. Only 3 genera returned seed. This year 7 genera are being grown. Stands of Dimorphotheca and Chrysanthemum are very good and it is hoped that some indication of seed production will be gained from these experiments.

OKLAHOMA - Ralph S. Matlock

A total of 437 plant introductions were received by personnel in Oklahoma between June 30, 1958 and July 1, 1959.

Dr. Huffine reported that the following introductions of Cynodon spp. have failed to survive Oklahoma conditions from an April 15, 1956 planting: 213387, 224131, 213389, 225126, 224149. PI 224694 produced a rather tight turf with a minimum amount of maintenance and was a medium-textured grass. Most of the other turf grass introductions that survived under Oklahoma conditions are being evaluated further.

Drs. Jack Harlan and Robert Celarier have grown and studied over 600 accessions of Andropogoneae at Stillwater in the process of evaluating the collection of Old World bluestems. Many of these accessions were obtained through personal correspondence. The following accessions have given excellent growth:

A1359 (PI 172720), Bothriochloa intermedia, from Marash, Turkey appears very promising.

A6580 (PI 213858), Bothriochloa intermedia, from India has a strong odor and high oil.

A2654 (No PI assigned), Bothriochloa intermedia, from India has a strong odor and high oil.

A5297 (No PI assigned), Bothriochloa intermedia, from India

A5410 (No PI assigned), Bothriochloa intermedia, from India

A2582 (No PI assigned), Formosan bluestem that makes tremendous growth. The accession produced 9.7 tons of air-dry forage per acre under irrigation.

A4027 (No PI assigned), Sorghum miliaceum, from Mt. Abu, India is a weak perennial that produced 14.4 tons of air-dry forage per acre.

In horticulture, Professor Kays reported that wild strawberries (Fragaria virginiana) collected in eastern Oklahoma have shown good drought resistance and have been crossed with commercial varieties. He also indicated a strong desire for stock of the wild peach from the Pyrenees Mountains which blooms two weeks later than present varieties.

Dr. Cordner stated that he had obtained 100 seed from five crosses of a Formosan sweet potato strain with Allgold and Porto Rico. He believes that this material will offer some advantages over the accessions from Tinnian and Caribbean areas.

Dr. Ealy made both greenhouse and field plantings of recent ornamental accessions. He reported that those planted outside died, but he plans to continue evaluations from greenhouse material.

Professor Payne plans to continue evaluating accessions of chrysanthemums.

Professor Hinrichs released a new grape hybrid which resulted from a cross of a local strain of wild grape with the white grape, Seneca. The resultant Cimarron variety is drought resistant and produces tender, juicy, sweet, blue-black berries that ripen more uniformly than Concord.

Mr. Hardin evaluated several accessions of Citrullus vulgaris at Geary, Okla., and reported that PI 216029 had extremely long peduncles that could serve as a genetic marker. Plants of PI's 173888 and 214316 were not dwarf. He also reported that okra accession, PI 217511, had sparse leaves, few branches, early maturity, and was very prolific with mostly spineless pods. Another okra, PI 169700 was dwarf, early, prolific and contained spiny pods.

The remainder of this report is a brief resume of the work conducted with new and special crops.

Mungbean - According to our record 114 accessions of Phaseolus aureus and Phaseolus mungo have been introduced. We have 50 of these planted this year along with 300 varieties, strains and selections for continuing evaluation of disease resistance and plant and fruit characteristics. None of these appear agronomically superior to existing varieties, but some have valuable characteristics. Perhaps a summary of all available information on mungbean accessions should be published.

Guar - Our records indicate that about 90 accessions of guar have been introduced. We have 81 introductions planted this year along with 139 varieties, strains, and selections for evaluation. A few of these accessions have withstood a severe attack of Alternaria. PI's 164476, 176378, 179682, 179684, 179929, 179930, 180288, 180432, 183315, and 183400 have been relatively free of Alternaria symptoms under field conditions. PI's 236479 and 236478 came into full bloom several days before Texsel and Groehler this year. Information available on guar accessions should be accumulated and published.

Cowpea - Some 450 accessions of Vigna representing six different species have been introduced. At least 200 of these have been grown and evaluated through the years in Oklahoma. Some of these introductions have contributed to the development of excellent forage varieties that are resistant to major cowpea diseases in Oklahoma. An area infested with the fusarium wilt organism is

available on the Stillwater Agronomy Station. In the future all accessions, selections, and strains will be screened through the fusarium wilt nursery. A small-seeded black cowpea obtained from a grower possessed excellent forage qualities and blooms and develops pods within a short time later in the season. The strain is moderately susceptible to canker and fusarium wilt. Mr. Hardin reported the following outstanding characteristics for certain cowpea accessions:

PI 225922 (Vigna sinensis) had distinct small leaves with green pods that turn purple at maturity.

PI 209971 (Vigna sinensis) contained four to eight pods per peduncle and matured early.

PI 189103 (Vigna sinensis) tends to set pods at each node.

PI's 215659 and 221534 (Vigna sesquipedalis) had vigorous vines and long pods.

PI 153831 (Vigna repens) had hardy creeping vines, small yellow flowers that opened at mid-day.

PI 210317 reported as Vigna nilotica may be another species. The pods were glabrous, 2 to 3.5 inches long, and were borne in clusters of 6 to 16. The yellow flowers opened at mid-day. The seed are small and matured late.

The available information on cowpea accessions should be collected and summarized to provide the needed information for developing a disease resistant dual purpose cowpea.

Peanut - Approximately 630 plant introductions of peanuts have been introduced. Approximately 100 accessions have been evaluated in Oklahoma. Leaf spot resistance and nut yields are evident in some accessions. Very little is known concerning the taste and flavor and other quality factors of peanut accessions.

Pigeon pea - PI 218066 (Cajanus cajan) was early and produced fair seed yields but medium amount of forage.

Jojoba - Plants PI's 246806 and 246807 were stored in the greenhouse last winter and transplanted to the field this spring. About 75 plants are available for planting at three latitudes in Oklahoma next spring.

Crotalaria - PI 189044 (Crotalaria retusa) produced good seed yield.

Sesbania - PI 167069 produced good seed and forage yield.

Fenugreek - Accessions tested to date make short growth but fair seed yield.

Guizotia abyssinica - PI 257588. We need to learn how to grow this plant.

Crambe abyssinica - PI 247310. Appears to do very well under our conditions but it needs further evaluation.

In addition to the above we are presently evaluating accessions of Cicer, Nigella, Indigofera, Lathyrus, Voandzeia, Ammi, and Eleusine.

As for future plans, we will probably reduce the work on cowpea, peanut and mungbean introductions and increase our effort on new plants as financial support and time permit.

COMMONWEALTH OF PUERTO RICO - Roy Woodbury

The cooperative project on "New Crops" is known as Hatch 94 (S-9) and involves the introduction and evaluation of "New Plants" for industrial and other purposes, and the preservation of valuable germ plasm of economic plants.

Through the cooperation of the S-9 Regional Project, the U.S.D.A., government agencies, local and foreign agencies, 1,083 accessions of plant material and seed have been obtained, most of which have been planted for evaluation or seed increase. These accessions may be broken down into four groups to give an idea about what the greatest interest has been for this particular year. Under forage species, 755 accessions were obtained emphasizing sorghum; 224 accessions of vegetables; 56 accessions of fruits, and 48 of ornamentals and miscellaneous. In addition many contacts have been made by our fruit breeder to obtain numerous accessions for the coming year.

The following is a summary of the work conducted under each specific crop:

Coffee: A collection of over 600 varieties and species from different parts of the world is being maintained and studied at Castaner.

Oil Crops: Observations are being made in permanent plantings of aceituno, Simaruba glauca, but they are still too young for evaluation. A castor bean variety test was conducted at Rio Piedras, but results were not favorable due to disease.

Sesame: A varietal planting of 42 sesame varieties was planted at Lajas using the "native" variety as a check. All data for this experiment has not been compiled as yet, but some Mexican varieties show great resistance to leaf spot.

Fruits: Ninety selections have been made from the original planting of hybrid strawberries for further studies and evaluation. Other fruits such as Mysore raspberry, naranjilla, peach, achiote, loquat, litchi, rambutan, mangosteen, cordia, cundeamor, papaya, grapes, pineapple, avocado, mango, and passifloras are in different stages of observation. The Mysore raspberry and naranjilla are two new introductions which have stimulated much interest.

Forages: Several promising lines of sorghum are being selected from the nursery for more detailed study. A comprehensive study of all native and introduced legumes is being started at Lajas Substation.

New Grasses: New introductions of Bermudas, Giant Pangola, and Blue Panic have shown great adaptability and behavior to varied environmental conditions in Puerto Rico and are undergoing more detailed study.

Vegetables: Of the numerous vegetables under study, rice has developed much interest due to the promising results obtained at Lajas, especially, of the varieties Zennith and Japan.

Ornamentals: The ornamentals have been removed from quarantine and transplanted at Corozal and Lajas for further observations.

SOUTH CAROLINA - J. A. Martin

Approximately 255 new plant accessions were received in South Carolina during the past year. These include cowpeas, sesame, peppers, okra, guar, watermelon, and chrysanthemums. Many of the old agronomic and horticultural accessions are being grown for further studies and evaluation of woody plants such as pears and ornamental shrubs which are planted at Clemson.

Peppers: The most promising accessions of peppers have been planted for further evaluation for various plant characteristics, initial red color and factors affecting the retention of the color, pungency, disease and nematode resistance. Several introductions are being used in crosses with cayenne strains for developing superior varieties for growers in the Pee Dee area of South Carolina.

Some progress has been made in isolating capsaicin from peppers. It is hoped that this work when completed will give some insight into the potentialities of capsaicin and how it could be used in industry.

The Clemson Nutrition and Agricultural Chemistry Departments are cooperating with Horticulture in making the color and capsaicin studies.

Okra: Okra breeding is being emphasized because there seems to be an urgent need for root-knot nematode resistance in a variety. A number of progenies of okra from crosses involving Clemson Spineless x root-knot resistant PI accessions have been planted. Artificial inoculation tests are underway in the greenhouse using the most promising strains for determining root-knot resistance.

Chufas: The 15 strains of chufas which have been selected as most promising from PI 184949 (from Nigeria) are being grown for increase. The most promising strains should be tested by wildlife and other agencies in the Southeast during the next few years for adaptation and feeding requirements of animals. Clemson would be willing to furnish tubers for regional testing and compile data. Yields of dried tubers run around 2,000 to 3,000 pounds per acre. The fatty oil content of the chufa strains ranged from 28.8 to 36.6 percent. Protein ranged from 5.75 to 7.44 percent.

Sunturf Bermuda: Sunturf Bermuda continues to give a good account of itself as a lawn grass. A number of plantings have been made at Clemson and throughout the state. It is liked most for its dark green color, and also because it is easier to mow than some of the other grasses, especially the Zoysia types.

Sesame: Evaluation and testing old and new accessions are underway at Clemson, Pontiac, and Florence, S. C. Pre-emerge weed control and fertilizer studies

are underway at Pontiac. The sesame breeding work is continuing for paper-shell indehiscent types, disease resistance, and higher production. There is no commercial production in South Carolina this year, but there are several agencies interested in sponsoring some acreage during 1960.

Bamboo: The 100 acre bamboo nursery at the Edisto Agricultural Experiment Station at Blackville, S. C., has made good growth since it was planted in 1956 and 1957. Three varieties were planted as follows: Phyllostachys bambusoides (60 acres), Phyllostachys viridis (30 acres), and Phyllostachys vivax (10 acres). A small varietal planting was made consisting of P. nigra henonis, P. meyeri, P. purpurata (both hollow and solid stem types) P. rubro marginata, and P. dulcis. The object of the bamboo project is to study the establishment, development, and evaluation of bamboo as to its timber and paper production ability and also as to requirements for mechanized harvesting.

Nutritional studies are underway in the greenhouse at Clemson to study fertilizer requirement of the crop.

Tephrosia vogelii: Three new PI accessions of Tephrosia vogelii, PI 241347, 257533, and 215495, have been received and planted at Clemson in a latin square design comparable with four other locations, namely: Mayaguez, Miami, Savannah, and Chico. The accessions possess considerably more rotenoids than reported in the strain of Tephrosia tested at Clemson in 1958. This crop appears to have potentialities provided the rotenone content and yield can be raised to a level whereby it will be profitable to the growers and extractors. The demand is strong for rotenone and two commercial extractors are keenly interested in the work. Nutritional work is underway with this crop in the greenhouse.

Guar: 67 guar accessions were received and planted at Pontiac for evaluations. These are the first guar accessions received since 1946.

Kenaf: A Brazilian variety of kenaf has been planted at Pontiac and Florence for producing samples for fiber studies. Plants are seven feet high, spaced 3" apart in 18" rows.

Crotalaria: Crotalaria juncea has also been planted at Pontiac and Florence for producing samples for fiber studies. Plants are six feet high, spaced 3" apart in 18" rows.

Ornamental Plants: Approximately 200 accessions of ornamental plants have been received and planted during the past two years. It is too early to give complete evaluation data on the perennial types as it will take time for them to grow to maturity or sizes for best appearance when used for landscape purposes. Mr. J. P. Fulmer and Mr. F. W. Thode, horticulturists, have worked hard to obtain facilities and labor to conduct the work. A large shade house has been constructed (30' x 80') and is now in use. A varietal trial garden (about 1½ acres) has recently been prepared and laid out in plots with irrigation equipment for testing and evaluating new plants. A 35' x 100' greenhouse is also being used for the work.

Corn and Sorghum: Dr. Alfred Marwiller, Pee Dee Experiment Station, Florence, S. C., reports that the corn and sorghum accessions which he has received may

have promise. The corn accessions are being held in cold storage until money and labor are available to evaluate them. These accessions apparently are "corn belt" types and are not adapted to the Pee Dee area. At the present time native corn types are plentiful and possess characters which need attention now. However, further testing of the corn accessions is planned.

The sorghum accessions look promising. Large open heads, large seeded, and dwarfness of plant are main characters found in the accessions and these will be useful in breeding work.

Bunch Grapes: Cuttings from 22 grape introductions were obtained in 1959, primarily from France and Germany, to test selections of breeders. Vigorous high quality varieties with disease resistance are needed in the southeast.

Pears: Seven PI pears, 2 Tennessee, and 11 U.S.D.A. pear selections were top-worked into blight resistant Richard Peters pear trees. Blight resistant pears with a minimum of grit cells or, preferably, no grit cells is the objective, so that suitable pears may be provided for the baby food industry.

Cucumis melo PI 250109 - Honey Dew rind, white flesh, Casaba flavor. This has good horticultural characteristics, but lacks disease resistance. It should be distributed to all muskmelon breeders for observation.

Lycopersicon esculentum PI 196297 - We are maintaining this stock as the original source of the curly mottle gene. It has no commercial value.

Solanum indicum PI 194166 - This came to us as Solanum gilo but it obviously is the same species as PI 194789 which was labeled Solanum indicum. PI 194166 appears to be locally adapted, with good plant vigor and good fruit production. However, we do not know what agricultural use might be made of it. It should be examined by all "new crops" projects. The fruit, with internal structure like an eggplant, might be edible; also the red peel might be a source of lacquer.

Solanum melongena PI's 140455, 143411, 169641, 175915, 176758, 204630. All contain one or more interesting horticultural characteristics that eggplant breeders might find of value. We have saved seed from 3 or 4 individual plant selections but do not expect to work with this crop.

Two watermelon PI's have shown good downy mildew resistance but unfortunately they are of the citron type. These were PI 171392 and 189225. These PI's cross very readily with all varieties of watermelons but it will probably be a long and difficult task to combine downy resistance from this source with high quality of such varieties as Charleston Gray. These PI's should be brought to the attention of other watermelon breeders.

One of the most useful genes to be introduced into this country was that for watermelon anthracnose resistance. Oddly enough, this did not come in as a PI but was sent to this country in the late 1920's by a missionary in Umtali, Southern Rhodesia. This one partially dominant gene has made possible the production of all the anthracnose resistant varieties of this country, such as Congo, Charleston Gray, Garrisonian, and Blackstone.

TENNESSEE - Wm. E. Roever

Seventy-five new PI numbers were received by Tennessee Agricultural Experiment Station workers to date in 1959 for studies in agronomic and horticultural adaptation or for use in other research programs. Thirty-eight additional PI acquisitions were received last year after submitting the progress report of July 10, 1958. Several hundred soybean numbers were tested for cyst nematode resistance.

J. K. Underwood reports 41 PI numbers received to date in 1959.

Nineteen acquisitions were received for evaluation in 1958, principally in the genera Dactylis, Festuca, Poa, and Cynodon (sprigs). Seedlings were made in the greenhouse in November 1958 for setting the following spring. These are doing nicely in the field. All Bermuda sprigs were set July 22, 1958. See accompanying sheet for data.

Evaluations for adaptation and use will continue as in the past.

Mr. James Epps of the ARS Nematology Section working at the West Tennessee Experiment Station has tested several hundred PI soybean lines for resistance to the soybean cyst nematode. Five lines were found highly resistant and this resistance was confirmed in a second test. The resistant numbers are: PI's 84751, 88788, 89772, 90763, and 92590-B. Some of these have already been used in crosses with locally adapted varieties in Missouri, Arkansas and Mississippi according to Epps.

The lines in these tests were received either from the Southern Regional Soybean Breeding Laboratory at Stoneville or the Laboratory at Urbana, Ill.

In connection with bean breeding, A. B. Strand has screened over 100 PI lines during the past several years. Included in these are 7 accessions of Dolichos and Phaseolus received during 1959. These are under observation for nematode and insect resistance. Strand would like to receive any Phaseolus or related lines having promise of nematode or insect resistance.

Reporting for the ornamentals group, Mr. J. S. Alexander lists 41 PI acquisitions during 1959 and 121 received in 1958, all being evaluated for climatic adaptation and desirability as ornamentals. These include 22 coleus varieties, 45 narcissus, 40 chrysanthemums and 55 miscellaneous woody plants.

Notes on survival only, are taken the first year after plots are established. Appraisals of growth habits, growth rates, vigor, propagation, and general desirability as ornamentals are made on two-year-old plots, and later, depending on the materials. All plants received in 1959 are growing in the field or greenhouse.

Among 1958 acquisitions the cinerarias survived our winter. Ericas were lost in the greenhouse probably from excessive temperature. Twenty-three lines of chrysanthemum survived the winter and are being increased for blocks of 12. Notes will be taken on blooming periods, flower characteristics, diseases, heights and hardiness. Thirteen mum lines were lost during the winter.

Bermuda Data (Summer 1958 and 1959)

J. K. Underwood

PI NO.	Growth from July 22 to frost	Color	Texture	Height	Density	Winter Survival
*224, 139	4-1/2 ft.	Medium green	Fine	Low	Very dense	Very hardy
224, 140	4-1/2 ft.	Light green	Fine	Low	Loose	Very hardy
224, 143	6-1/2 ft.	Medium green	Medium fine	Low	Loose	Very hardy
224, 145	6 ft.	Medium green	Fine	Low	Dense	Very hardy
224, 146	6 ft.	Medium green	Fine	Low	Very dense	Very hardy
**224, 149	2 ft.	Dark bluish-green	Coarse	Very low	Very dense	90% winter kill
224, 151	2-1/2 ft.	Light green	Fine	Low	Loose turf	Very hardy
225, 809	2-1/2 ft.	Light green	Fine	Low	Loose turf	Very hardy

Variations in growth may have been due in part to variability in fertility and in stoniness of the soil.

*A very desirable Bermuda.

**A very pleasing sod was formed. Should escape winter injury in the Coastal Plains most years, but out of place in Tennessee.

Of the 45 narcissus lines planted last September only two bloomed this spring.

Of the woody acquisitions planted in April '58, Rosa onoli (PI 28,005), Ligustrum delavayanum (56,317), Osmanthus illicifolium "Gulftide" (213,308), and Itea japonica (226,131) survived the winter and are growing normally.

In the following, tops were winter-killed to the ground but new growth is established: Quercus phillyraloides (229,889), Distylium racemosa (236,260), Callicarpa tosoensis (237,853), Stachyurus lancifolius (237,907), and Quercus sp. (237,896). Tops were partially winter-damaged but growth is now good in: Rapheolepis umbellata (54,670), Quercus glauca (229,887), Quercus wrightii (235,433), Eurya ochracea (235,502), and Ilex rotunda (237,879). Those that were killed outright were: Eurya emarginata (235,425), Pinus sp. (234,648), Buddleia curviflora (23,785), Ilex hanceana (237,875), Ilex mitchagara (237,878), and Chimonanthus praecox (241,484). The two Ilex species and Eurya were re-established from liners taken from the original plants.

Quercus acutissima continues to do excellently in campus landscaping.

T. R. Gilmore, of the Plateau Experiment Station at Crossville, has 22 PI accessions of apples in various stages of growth. Twenty of these were received as scion wood. Of the 7 received in '59, all were topworked onto Ben Davis and are growing. Of 6 received in 1957, only PI 206542 (Abbondanza) has fruited so far. Of the 9 accessions received in 1953, five have fruited. Growth has been good on Kimball McIntosh (175,034) but fireblight was heavy in '58. Roten Finken Werder (194,096) has also grown well. Accessions that have fruited are PI 184382 (A-2); 179615 (Sonderskov); 176819 (Laxton's Reward); 194096 (Roten Finken Werder) and 194420 (Spasserud).

Gilmore plans to use PI 184382 in a rootstock project.

Three Fragaria vesca importations are being used in a cytological study by a graduate student. These are PI's 25045, 251046 and 251779, the last one from the mountains of Italy and the others from Yugoslavian highlands.

Plants of PI 253586 were received as Fragaria vesca variety Attika from Greece. It is said to be virus resistant and everbearing. The greater vigor of these plants when compared to other Fragaria vesca lines led us to make a preliminary count of chromosomes in the pollen mother cells. In the limited material available we found the chromosome number to be in the range of 12-14 rather than the expected 7. This suggests the variety is a tetraploid or "near-tetraploid". The finding is tentative, subject to further study when propagated plants are ready.

TEXAS - R. G. Reeves

Two new strains of grasses and one of peanuts are being increased this year in anticipation of release: (1) Bouteloua curtispindula (PI 216244), collected west of Chihuahua City, Mexico in 1953. This accession is superior to local strains in forage and seed production. (2) Setaria macrostachya (PI 216555) collected north of Chihuahua City in 1953, an excellent forage producer. (3) A selection of Arachis hypogaea from the segregates of a cross between Spantex

and PI 161317. This selection shows promise of meeting the demand for a variety with slightly larger kernels than the smallkerneled Spanish, which is commonly grown. It is now in its fourth year of field testing. Release to growers depends on the outcome of the present year of performance and quality tests.

Forage and Turf Grasses: Three accessions of Dichanthium received from the Oklahoma Station (Nos. A2583, A3025, A4080) have shown promise as forage grasses on the basis of first year observation.

Four introductions of Cynodon are fine leaf types and some of them eventually may be found useful on home lawns and golf courses. PI 213387 retained most of its green color until December 13, and withstood several nights of freezing temperatures. PI 213388 showed the best vigor, most rapid establishment, and most extensive root system of the four. PI 224140 held its green color later in the season than ordinary strains, and PI 213390 had an extensive root system.

Sesame: Of 168 introductions on hand, 12 have been found of sufficient interest that they are being retained in the program and have been assigned S.I. (Sesame Index) numbers. Forty-three additional old introductions and several new ones are being re-increased for rejuvenation.

Safflower: Five accessions of Carthamus, comprising three species, showed some especially desirable characters when grown at the Weslaco Substation. In most of these accessions, however, undesirable characters were found associated with the desirable ones. Four of the introductions (PI's 202728, 235658, 235668, 244354) apparently are immune to leafspot but are very pubescent, and the pubescence seems to encourage red spider infestation. The other (PI 170080) is susceptible to leafspot, but is not seriously damaged by the red spider. Consideration is being given to trials involving crosses and selection, in the hope of obtaining new strains with predominantly desirable characters.

Ornamentals: Thirty-three Japanese accessions of Chrysanthemum were grown in the open by the Department of Floriculture and Landscape Architecture, and seven of them were rated excellent or good in general acceptability. The unusual, spectacular colors and flower forms attracted wide public attention.

Plants For Possible Industrial Use: Eight accessions of Camelina sativa were grown at the Weslaco Substation last winter and harvested in the spring. As judged from a single year of performance, this species can be grown as a field crop. Its seeds contain a substantial percentage of oil, but the oil has not been completely studied as to possible value. The Peoria Laboratory is now making chemical studies of the oil, and additional information is anticipated in the near future. Camelina sativa is a weed in some regions of Europe and the United States, and special care has to be taken to prevent it from becoming widespread.

Ten additional species whose seeds contain industrial oils, distributed among five families, were planted at College Station for preliminary appraisal as field crops. The early plantings of most items were started in "jiffy pots" in the greenhouse, and seedlings of all ten of them were made directly in the field, by dropping the seeds in hills and covering them lightly with a mixture

of peat moss and soil. To some extent, the difficulties to be mentioned in connection with certain species might be the result of erratic weather conditions which prevailed and the soil types on which the plantings were made. The spring weather was characterized by heavy floods and cold winds, and the soils at best can hardly be considered "warm". The principal plantings were made on the uplands at College Station, and small supplemental plantings of all items except numbers 8, 9, and 10 were made on alluvial soil near the Brazos River, about five miles from College Station. Except as otherwise noted, the results obtained at the two locations were so similar that they need not be given separately. The results and deductions follow.

(1) Rudbeckia bicolor, var. superba. Four plantings were made from February 15 to April 4. By July 1, plants of the February and March plantings were scarcely distinguishable, except that stands of only 45 to 60 percent were obtained from field plantings. The first flowers appeared from May 15 to May 23, and seeds began maturing about June 25. An occasional plant showed disease, apparently a virus, in early May, and about a month later a powdery mildew did slight damage. The April 4 planting was destroyed by a spring flood soon after emergence, and no results were recorded. Except for the problem of poor stands from field seedings, this variety might be adaptable to field cultivation after only a little additional experimentation.

(2) Euphorbia heterophylla. Four plantings were made, from February 15 to April 4. For all field seedings except that of April 4, stands fluctuated around 75 percent, but approximately two-thirds of the plants obtained became diseased. The disease was tentatively identified by Dr. L. S. Bird, Department of Plant Physiology and Pathology, as Pythium root and stem rot. Flowers were first recorded on April 23 and seed maturity began about June 2, dates of flowering and maturity being about the same for the various dates of planting. The April 4 seeding was destroyed by a flood. The disease mentioned above is by all odds the most serious problem encountered in the local upland soil; however, it is of special interest that another planting of the same stock was made on alluvial soil near the Brazos River, and no indication of disease appeared there. It may be, therefore, that the upland soil, where the disease was serious, is heavily infested with the casual organism while many other soils are not. Additional trials of this species ought to be made on a variety of soils. If control of the disease can be made economically feasible, E. heterophylla has possibilities of becoming a field crop.

(3) Papaver rhoeas. Approximately 1400 plants were obtained by both greenhouse and field plantings, the dates of planting being February 15, March 1, and March 18. When the seedlings were a few inches tall, they began to die, apparently from disease; by June 1 about 90 percent of them were dead, and the rest were seriously diseased. The disease was tentatively identified by Dr. L. S. Bird as bacterial blight. Only about five plants finally produced flowers, and none produced sound seed. This performance seems strange, for poppies are reputed to be relatively free from diseases and easy to grow. They are commonly grown in this locality without difficulty. Additional trials of P. rhoeas, including fall plantings, would seem worth while.

(4) Cynara cardunculus. Plantings were made at three dates--February 15, February 24, and March 14, the first a greenhouse planting. The field seedings gave about 60% stands. As of July 1, the plants are vigorous and hardy,

and show no appreciable damage from insects or diseases; however, they show no indication of producing flowers. They will be allowed to remain in the field for further observation in 1960.

(5) Momordica balsamina: Plantings were made April 3, 4, and 20, the total consisting of about 700 hills. About 100 plants were provided with trellis, and the remainder were allowed to develop on the ground. Good stands were obtained from all plantings. Flowers were first noticed on the earlier plantings on June 9, and on the April 20 plantings on June 20. Fruits began maturing on July 1. Adaptation appears to be good, and no indication of insect or disease injury has been detected. As of July 1, performance of the plants without trellis seems as satisfactory as that of plants with trellis, but it is anticipated that weeds will become more serious in those without trellis, for the spreading of the vines on the ground will make weeding laborious. If this species can be grown satisfactorily without trellis, it probably can be put into production in this locality in a relatively short time.

(6) Momordica charantia: About 50 hills were planted directly in the field. This species is very similar in performance to M. balsamina; in fact, the only difference noticed by July 1 is that it may be a few days later in maturing.

(7) Dimorphotheca aurantiaca: Greenhouse plantings were made on March 1 and 24, and field seedings on April 4 and 28. The total number of hills planted was about 8000. Early in May, the older plants began to wilt and die, and the difficulty was tentatively identified by Dr. L. S. Bird as Fusarium wilt. The two earlier plantings, which were started in the greenhouse and transplanted to perfect stands in the field, continued dying until only about 5 percent are still living as of July 1. The later plantings, made directly in the field, also show considerable disease but obviously less than the earlier ones. Stands obtained by field seeding were very poor, even though replantings were made; the stands remaining, after subtracting for poor emergence and disease, is from 10 to 40 percent. Seed from two sources and possibly of different strains were planted; viz., C. D. 32946 and C. D. 32982. The incidence of disease in C. D. 32946 is a little less than that indicated above, but this might be the result of soil differences. It seems worth while to give this species some further trial, planting in a different location, possibly in the fall; but judging from this single trial it must be regarded as a failure. The earliest flowers opened about the middle of May, and the beginning of seed maturity was about July 1.

(8) Heliopsis helianthoides: About 35 hills were field seeded on February 24 and an equal number on March 15. Emergence was poor, and the few plants obtained lived only a few weeks. The cause of failure was not determined.

(9) Helianthus maximiliani: Two small plantings were made directly in the field, on February 24 and March 15. Stands are good, and the plants are healthy and vigorous. The first planting began flowering about the last of May, the second early in June. Apparently normal seeds are being formed, but as yet none are mature. Results of this preliminary study indicate that the species has promise as a field crop in this locality.

(10) Salvia columbariae: Small plantings were made directly in the field on February 24 and March 15. Emergence was fair, but when the seedlings were small and delicate a spring flood damaged them so seriously that only three plants grew to maturity. First flowers appeared about June 1, and seed maturity was first observed about four weeks later. The 1959 plantings offer little basis for evaluating this species as a crop, but the plants which survived the flood seem fairly vigorous and show no sign of damage by disease or insects.

Summary, Plants For Industrial Use: On the basis of the first year of observation, only one of the seven species planted on both upland and alluvial soils near College Station seems to be influenced by the soil differences; Euphorbia heterophylla, when grown on alluvial soil, showed no sign of the disease which was disastrous on the upland farm. The items which seem to be adapted wholly or in large part to the conditions under which they were planted are Camelina sativa, Helianthus maximiliani, Cynara cardunculus, Rudbeckia bicolor, var superba, and the two species of Momordica. The problem of obtaining satisfactory stands by field seeding needs further study in all items, except possibly in Camelina sativa, Helianthus maximiliani, and the two species of Momordica. Very little information has been obtained on methods of seed harvesting, but our limited experience indicates that this will be extremely laborious for Euphorbia heterophylla and probably less so for the other items.

Plans For The Coming Year: We expect to concentrate on plants for industrial use but not to discontinue the activity on other crops.

Introductions of Merit for Forage, Wildlife, or Ground Cover - Morris Byrd

The following introductions have shown worth while characteristics in plantings at the Plant Materials Center, Arcadia, Florida.

Rod Row Plantings

Digitaria sp. PI 196342. Promising for use as forage plant. Abundant foliage, few stems, vigorous grower, earliest growth in season of any Digitarias. Established from seed.

Panicum lilongwe PI 238346. Possible cut green forage. Good summer growth, 5' to 6' tall. Perennial bunch type grass, few stems, wide leaves. Killed by freeze, rapid comeback in Spring. Established from seed.

Panicum maximum v. trichoglume PI 202497. Forage plant. Perennial, established from seed. Frozen back by freeze but made rapid regrowth. Fine leaf, find stem, maximum height approximately 4'. Producer of seed which mature fairly uniform.

Panicum polygonatum PI 203869. Annual plant of possible value for wildlife (bird) food. Produces abundance of seed which shatter at maturity. Foliage dead by mid-November. Good re-seeder.

Brachiara lata PI 238236. Useful as annual forage plant and seed for wildlife (bird) use. Soft, succulent foliage, 30 inch in height during summer. Dies out in early Fall.

Brachiara ruziziensis PI 247404. Appears useful for forage and silage. It is a perennial, growing 30" high, producing large quantity of wide leaves. Makes rapid recovery after being killed back by freeze.

Setaria sphacelata PI 247411. Possible cool season forage and silage crop. Perennial, erect growth with good quantity of foliage. Made growth in winter until frozen back by freeze in January. Recovery moderately fast.

Cassia leshenaultiana (Chamaecrista leshenaultiana) PI 204365. Annual plant showing promise for producing wildlife (bird) food. Erect growing, abundant seed producer; seed maturing in late fall. Good re-seeder.

PLANTS ADVANCED TO SEED INCREASE AND SUPPLEMENTAL STUDY PHASE:

Panicum stapfianum PI 178254. Perennial, erect growing plant of value for forage, possibly cool season. Fine leaves and stems. Remained green until winter freeze; showed quick recovery from freeze. Seed producer.

Panicum makarikariense PI 184776. Forage plant, perennial, making quick recovery after winter freeze. Viable seed producer. Foliage has light bluish-green color.

Centrosema sp. PI 199739. Vine, perennial legume, of promise for grass-legume complex. Roots at nodes. Produces much foliage, freezes back but has quick recovery.

Desmodium distortum PI 219840. Perennial, erect growing, 4' to 5', producing many seed for wildlife (bird) use. May be equivalent to Lespedeza bicolor for South Florida. Freezes back in winter.

Phaseolus bracteata PI 158831. Forage and wildlife, perennial vine, seed production good until November. Foliage succulent and in good quantity.

Desmodium ovalifolium PI 227477. Perennial for use as forage in legume-grass complex. Prostrate in growth, 40" spread, roots at contacts with soil. Hardy until heavy frost or freeze.

Introductions of promise at the Plant Materials Center, Americus, Ga. are as follows:

Rod Row Plantings

Brachiaria decumbens (Signal grass) PI 210724. Aggressive and spreading perennial grass. Remains green late in season.

Chloris gayana (Rhodes grass) PI 203851. An aggressive grower. Good winter survival.

Chrysopogon montanus PI 213885. Weak growth first year but heavy growth to 4 ft. second season. Good seeder. Good winter survival.

Lolium multiflorum (Italian Ryegrass) PI's 240731, 241912, 241913. Three tall growing ryegrasses that appear to be more productive than the commercial strain.

Medicago falcata PI 14488. Small plant but furnished good ground cover.

Medicago falcata PI's 163394 and 231731. Two of the better of the several grown.

Medicago hispida PI 244313. Spread to 6'. One of the best Bur-clovers of the many grown.

Medicago hispida PI 246740. Another very good one.

Medicago truncatula PI 244285. Heavy seeder. Made good growth, spread to 4 ft.

Panicum coloratum PI's 166400, 178251, 178257, 184776, and 207990. These are rather rank growing but somewhat stemmy perennial grasses that have made excellent growth on fertile sites.

Panicum makarikariense PI 210692. Another large growing, vigorous perennial grass on fertile sites.

Panicum maximum PI 208397. This one is a strong perennial.

Pennisetum ciliare PI's 141474 and 203365. The several buffel-grasses tried here have not looked too promising. These two have been the best performers in the lot.

Phalaris arundinacea X P. tuberosa (Ronpha grass) PI 233707
This made excellent growth.

Phalaris arundinacea - Corvallis, BN-1391, MI-4694-54, Ark. Upland, PI 207959
Five good Reed canarygrasses with the second and last holding green color well into the summer.

Stipa hyalina PI 197967. Nothing extra the first year but made good growth - to 3 ft. - and seeded heavily the second year. Stays green about all year.

Trifolium changeaniansis PI 226101. Good foliage 8 in. high by 2½ ft. spread. Somewhat resembles White Dutch.

Trifolium diffusum PI 238362. Good growth - 1 ft. high by 3 ft. spread.

Trifolium globosum PI 168636. Dense growth 6" high by 3½' spread.

Trifolium lappaceum PI 244323. Good growth 8" high x 3½' spread.

Trifolium meneghinianum PI 235521. This closely resembles Ball clover. Identity is questionable. Good growth and habit on good land.

Trifolium pallidum PI 201213. Good foliage, height 1' - spread 3'.

Trifolium resupinatum PI 205238. The best of the many Persian clovers tried.

Trifolium ruepellianum PI 234411. Good growth with 3½' spread.

Trifolium strictum PI 238372. Formed a dense mat 6" high x 18" spread.

Vicia sepium PI 238382. Made good growth with 6 to 8' spread.

Plants advanced to seed increase or supplemental study stages.

Lathyrus sylvestris F.C. 32128. Made good growth and remained green all through the summer and fall. A potential ground cover for critical areas.

Panicum stapfianum PI 178257. A perennial with possibilities as a grazing plant.

Setaria argentina PI 186346. A rather rank growing perennial grass that has been under observation for sometime. Has forage potential.

Trifolium nigrescens (Big Ball Clover) PI 206926. When this gets the right conditions it is a rank grower 2' high by 5' spread. It is difficult to establish.

Trifolium vesiculosum PI 233782 (Late strain)
PI 233816 (Mid season)
PI 234310 (Early)

These large growing clovers show considerable promise due to the large amount of forage produced. They grow waist high and have a spread of 5 to 6 ft. Good seed crops produced. Apparently as easily established as any clover.

Plants in field plantings--under study on SC district cooperators' farms.

Bromus catharticus (Nakuru rescuegrass) PI 195476. A rescue that grows well and is relatively disease free.

Digitaria eriantha (Longfinger grass) A clone from a lost PI number. A rank grower on fertile soils, rather stemmy and must be increased vegetatively. Forage potential.

Eleusine coracana PI 217608. A fast growing grass - to 3 ft. - that should be a good bird food. Produces abundant seed.

Ornithopus sativus (Serradella) PI 189163. A winter cover-crop legume that has performed fairly well on this station but has not done so well in the field.

Panicum maximum (Coosa Guineagrass) Selections from lost PI number. A tall (to 8ft.) vigorous grass of good quality that is annual. It has rather poor seeding habits.

Phaseolus bracteatus PI 158831. A perennial pea with good foliage that shows promise as a forage plant. Rather poor seeding habits and is susceptible to root rot.

Trifolium michaelaneum PI 120136. Requires very fertile soil. Growth about equals crimson clover.

Vicia narbonensis PI 206927. A large seeded Vicia that makes fairly good upright growth.

Suggestions from the State Experiment Station Division, ARS-Donald Y. Perkins

Since Dr. Kennard was absent from the meeting, Dr. Perkins read the following letter written by Dr. Kennard to Mr. J. A. Martin:

"Several actions taken by the NC-7, W-6, and NE-9 Technical Committees at their meetings last year will be of interest to the S-9 group.

NC-7 - One of the most significant actions taken was the allotting of \$5,000 for the support of utilization research. The money was secured by reducing allotments to some of the contributing projects and by the planned termination of several contributing projects on June 30, 1959. This allocation indicates the interest which the NC-7 group has in supporting research in utilization. It also was brought out at the meeting that the Northern Utilization Research And Development Division, U.S.D.A., at Peoria, Illinois, is the agency responsible for all "new crops" chemical screening. Dr. I. A. Wolff of this laboratory should be contacted by anyone in the Southern Region wishing chemical assays of new crops.

W-6 - The group voted to have each state representative collect information as to which plant breeders are working on what species and for what characteristics. This information, to be tabulated by the regional coordinator, will be of great value to plant breeders in the Western region.

NE-9 - This group also expressed interest in having available information concerning activities of plant breeders at the various experiment stations. Instead of collecting such information in the Northeast only, however, they recommended that the American Society for Horticultural Science Committee on Vegetable Breeding and Varieties collect information as to which plant breeders are regularly testing species for a given characteristic.

"I would like also to bring again to the group's attention the fact that the Committee of Nine at their February, 1958, meeting urged that the Regional Associations of Directors review progress and plans on all regional projects which have been in existence for ten years or longer. While action requiring a formal report has not as yet been taken by the Southern Directors, such reports are now required in the North Central and Western regions. Since the S-9 project completes its first ten years of existence in November of this year, it would be well for the group to be thinking about summarizing accomplishments during this period as well as formulating proposals for the future.

"It is too bad that you were unable to arrange a joint meeting with the NC-7 group which plans to meet at Fort Collins in September. This represented one of the few opportunities which have arisen when two of the 'New Crops' projects could have met together and I believe that both would have profited by a joint meeting.

"I hope that next year any conflicts will be resolved so that I can attend the S-9 meeting. Regular attendance is not only valuable to me personally but also lends continuity so far as this office is concerned.

"Please extend my personal greetings to the members of the S-9 Technical Committee and my best wishes for a successful meeting."

Hyland: If you have work for Dr. Wolff or others at the Utilization Research Laboratory to do, requests for it should be made through Dr. Quentin Jones and copies should be sent to Drs. Wolff and Langford.

NEW CROPS RESEARCH BRANCH REPORT ON ACTIVITIES RELATED TO COOPERATIVE REGIONAL PROJECTS

At each annual meeting of the Cooperative Regional Technical Committees, the Branch has submitted a report on recent activities and future plans considered to be of major interest to the respective state representatives. It is their responsibility to bring to the attention of their associates those items which will strengthen or coordinate the "New Crops" program. The 1958 report was prepared in much detail outlining the objectives of the Plant Introduction and Crop Development Sections of the Branch. The minutes of the National Coordinating Committee held at Atlanta April 9-10, 1959 also cover various phases of work directly supervised from Beltsville. The report now being submitted to this group is purposely briefed to prevent duplication of facts already in the Committee's hands, and points out only those additional items of immediate future interest.

PLANT INTRODUCTION SECTION - H. L. Hyland

The major functions of this Section cover the procurement, identification and inventorying of plant stocks from both foreign and domestic sources. This entails the use of botanists to determine areas where specific plants may be located, plant inspection and quarantine clearance and use of plant

and seed taxonomists in accurately identifying and cataloging the introductions. Recent emphasis has been placed on plant resources investigations which deal with sources and local uses of plant materials throughout the world. This work is the backbone of our industrial and chemical screening program cooperative with the Department utilization laboratories. A report related to this work has been prepared and presented at this meeting by Dr. I. A. Wolff, NURDD, Peoria.

Foreign Exploration

During the past year four major explorations were completed. A summary of the first two explorations appears in the 1959 National Coordinating Committee meeting minutes.

Greece, Yugoslavia, Austria - Forage plants
Near East and Mediterranean - Safflower and other oilseed crops
Australia - Ornamentals (Longwood Project)
Argentina, Brazil, Paraguay, Uruguay - Peanuts

The collecting of ornamentals in Australia was unusually successful in that among the 850 items were many species introduced into the U.S. for the first time. Since most of these should be best adapted to the warm, drier regions, the propagation and increase is centered in the Los Angeles County Arboretum, Arcadia, California. The exploration for peanuts should prove especially valuable to the S-9 states. A preliminary report was recently received from Dr. W. C. Gregory, North Carolina State College who carried out the assignment. A total of 207 collections was made of wild species as living plants and green seeds. 239 collections of cultivated types were made as dried seed. Among the wild types are some which have not been introduced heretofore, and a complete and accurate taxonomic classification will require considerable time and effort.

There are three foreign explorations currently under way, and the one related to vegetables should prove valuable to all the regional projects. Dr. E. W. Davis, a vegetable crop breeder from Beltsville headquarters is representing the Plant Introduction Section, and has the specific objective of locating breeder's stocks. The three areas being covered are:

Western Europe and British Isles - Vegetables
Northern Europe - Ornamentals (Longwood Project)
Mexico - Collections for utilization screening.

Future plans call for a return trip in 1960 to Yugoslavia and adjacent areas for forage plants. The trip in 1958 revealed such a wealth of species and ecotypes that it seemed desirable to attempt more complete coverage. Proposals are at hand for both vegetables and fruit in the Mediterranean and Near East countries, but political conditions do not permit long-range planning.

U.S.S.R. Plant Exchange

This committee may be interested in progress of our exchange with U.S.S.R.

In March 1959 the first recent bona fide attempt was made through prescribed channels, and by mid-summer 309 items had been received with 268 forwarded from the U. S. Results have been encouraging, and the Plant Introduction Section will be glad to attempt procurement of specific (not general) research stocks.

Domestic Exploration

This type of exploration has presented many problems in the past few years, but procedures have been worked out whereby legitimate proposals of regional interest can be considered. Cooperative agreements have been set up with the Iowa and Washington State Experiment Stations, offering simple facilities for meeting expenses, once funds have been made available from the Beltsville headquarters of the New Crops Research Branch. The old agreement with the New York Experiment Station is being revised in order to cover domestic collecting later this summer. No agreement has been instituted for S-9. Domestic collections under way in 1959 include:

Rubus spp. from Ozarks NC-7
Highbush blueberries NE-9
Astragalus - Lupinus spp. W-6
Medicinal plants - Ornamentals W-6

A rather complete summary on various aspects of domestic exploration appears in the minutes of the 1959 National Coordinating Committee meeting. It should be emphasized that the Coordinators for the respective regions should be kept aware of all suggestions or plans for domestic collecting.

P.L. 480 Plant Resources Research Projects

Under this program, the Branch will undertake local collecting activities in Israel, Turkey, and Yugoslavia. The program will be operated with local technical workers and coordinated by members of the Plant Introduction Section. Although emphasis will be on plants of utilization interest, we will request propagating stock for regular crop improvement needs. State representatives should point out to their station workers that if there are materials desired in these specific countries, the information should be sent to the Regional Coordinator who will forward the requests to the Plant Introduction Section. These projects will operate over the next three to five years. Thus there is a great opportunity to carefully screen potential plants of these regions.

CROP DEVELOPMENT SECTION - Report by W. E. Whitehouse¹

Vegetable Evaluations

A male sterile pickling cucumber breeding line developed at the South Carolina Agricultural Experiment Station from a 1951 cucumber introduction from India has been found to carry genes for resistance to anthracnose and both powdery and downy mildew and shows greater promise for the development of hybrid

¹In general this report covers only that part of the Crop Development Section program which relates to the work of the Southern Regional Cooperative Project.

cucumber seed crops than previously developed lines. The male sterile gene can be maintained in a segregating condition so that 50 percent of the plants from the seed stock will be male sterile. The other 50 percent can easily be rogued out as the male flowers appear several days in advance of the female. (CR i2-5) (with S-9)

A new red-pigmented leaf lettuce variety Ruby has been developed by the U.S. Department of Agriculture's research workers and released to growers for trial. Two 1936 introductions of garden lettuce varieties, one from Czechoslovakia and the other from Turkey, were among the parents used in the breeding of this variety. Ruby is a large, midseason, savoyed, slow-bolting lettuce of good quality. It is widely adapted and will make a crop any place where lettuce is grown. (CR i2-5)

An inventory of tuber-bearing species, varieties, and hybrids of Solanum currently being maintained at the Potato Introduction Station, Sturgeon Bay, Wisconsin (IR-1 Project) has recently been issued by the Wisconsin Agricultural Experiment Station. The stocks, which are available for research studies, include 662 introductions from the wild of the parent species, 197 introduced hybrids of these, 98 foreign potato varieties, and 49 American varieties. The collection includes material from 15 foreign countries. Many of the introduced species have been studied cytologically and the chromosome counts are reported. (CR is-5)

The new black-rot-resistant, fusarium-wilt-tolerant Canbake sweet potato variety, recently released to growers by the Georgia Agricultural Experiment Station, is an open-pollinated seedling of the Australian Canner variety which the Department introduced from Australia in 1938. (CR i2-5)

The Manalucie tomato variety developed and released by the Florida Agricultural Experiment Station several years ago contains the blood of two wild Peruvian tomato introductions. This new variety, well adapted for growing in southern Florida, has internal fruit characters superior to any tomato variety grown in that state. Inherently resistant to several diseases, including leaf mold, fusarium wilt, gray leafspot, early blight, sore shank, and collar rot, it is the only variety that stands a chance of being profitably grown on "old" land. (CR is-5) (with S-9)

Forage and Range Plant Evaluations

Development at the Texas Agricultural Experiment Station of the dwarf internode Dawn castor bean variety from a 1938 introduction of castor beans from Brazil has been previously reported. Today the threat of introducing serious diseases into the areas of high commercial acreages of castor beans has been responsible for a change of procedure in the handling of new castor bean introductions. During the past year, arrangements have been made for growing all castor bean introductions for one year at the Beltsville Agricultural Research Center for observation of possible diseased stocks. Following the year of quarantine, the increased seed will be made available for distribution to field research workers. This procedure is essentially a quarantine measure to insure against the introduction of potentially harmful diseases from foreign countries to centers of commercial castor bean production in the United States. (CR ia-7)

A 1946 introduction of South African Buffel grass, Pennisetum ciliare, has the most vigorous seedling growth and highest yield of any of the Buffel grasses tested by research workers in the United States. This T-4464 strain of common Buffel grass is one of the most promising of the new forage crop species introduced for the improvement of range grasses adapted to the mild climate areas of the Gulf States.

Grass breeders generally agree that lack of fertility of normal Dallis grass varieties, pentaploids with a $2n=50$ chromosome number, is associated with irregular meiosis; thus the rapid development of improved varieties with dependable seed production has not been possible. In a joint study, two scientists, Bashaw of the Agricultural Research Service and Holt of the Texas Agricultural Experiment Station, discovered that a 1956 Department introduction of Dallis grass, Paspalum dilatatum, from Uruguay had normal sexual reproduction with regular meiosis and a chromosome number of $2n=40$ appears to be the answer to this problem. As improved varieties become available, there should be wide acceptance of this excellent forage species which in the past has been held to a limited acreage by lack of dependable seed production. (CR i2-7)

The Gordo Bluestem forage grass variety originated as a Soil Conservation Service selection from a 1950 Department introduction of South African Andropogon seed. After an eight-year test, it was found to be well adapted to those areas of Louisiana and Texas where mild winter temperatures prevail. Additional field testing by experiment stations may show that it has wide farm use throughout the area where it is adapted. (CR i2-7)

Ornamental Evaluations

A small evergreen shrub, Fatsyhedera lizei, a hybrid between a compact, glossy-leaved Japanese shrub and a large-leaved Irish variety of English ivy, was introduced from France in 1926. It has become a welcome addition to the plants grown in southern gardens. The large commercial nurseries of the South handle it in quantity and recommend it highly. (CR i2-10)

New Crop Development

Cooperative arrangements were recently completed with the Alabama Polytechnic Institute for the establishment of a 100-acre planting of bamboo at the Lower Coastal Plain Substation, Camden, Alabama. This provides a second site in the South for the large-scale investigation of the potential value of bamboo as a crop source of paper pulp. In addition to a planting of approximately 100 acres for fertilizer, harvesting, and pulp yield studies, smaller plot studies are planned for a comparison of the relative yields of pine, poplar, and bamboo. (CR i2-10)

The large-scale cooperative bamboo planting at the Edisto Substation of Clemson Agricultural College which was started to determine the potential value of bamboo as a crop replacement source of paper pulp has been completed. This planting will be used for harvesting experiments when adequate size is reached in 5 to 8 years. A greenhouse sand culture nutrition experiment using Phyllostachys vivax was initiated at Clemson Agricultural College. (CRi2-10)

At the U. S. Plant Introduction Station at Savannah the nurseries of several bamboo species were expanded so that approximately 175,000 plants would be available for the larger planting at Camden, Alabama, in spring of 1960. A total of 60 shipments of bamboo material or planting stocks were made from the U. S. Plant Introduction Stations at Savannah and Miami. These shipments involved 7600 plants or rhizomes for planting stocks and approximately 2500 pounds of culm material for processing studies. A summary of bamboo shipments from Savannah to southern states since 1928 was partially compiled in preparation for a survey of bamboo groves to obtain growth data on many species located on a wide variety of soils and in diverse ecological conditions. (CR i2-10)

A total of 40 Tephrosia vogelii seed collections made in Angola, Belgian Congo, and other areas of the world have been sent to the Federal Experiment Station, Mayaguez, Puerto Rico where breeders are working on a program to develop higher rotenone-yielding lines for test in the southern part of the United States. (CR i2-10)

National Seed Storage

A full report on the National Seed Storage Laboratory policies and procedures is to be found in the 1959 minutes of the National Coordinating Committee.

Publications

"Male Sterile Cuke Speeds New Hybrids," W. C. Barnes, Seedmen's Digest 10:24-25. Jan. 1959.

"The Effect of Plant Arrangement on Cross-Pollination in Muskmelons," Edwin James, John Massey, and W. L. Corley, (To be published in Proc. Am. Soc. Hort. Sci. 1959).

"A Planting, Cultural and Progress Guide for Buffel Grass," Pat Higgins, leaflet publication from Sutherland Springs, Texas.

"Dallisgrass (Paspalum dilatatum), E. C. Bashaw and E. C. Holt, Agron. Journ. 50(12): 753-756. Dec. 1958.

"The Effect of Mulching on Growth and Susceptibility to Winter Injury of Evergreen Azaleas," J. L. Creech and W. O. Hawley, (To be published in Proc. Am. Soc. Hort. Sci. 1959).

Report on Meeting of National Coordinating Committee - R. D. Lewis

The National Coordinating Committee is made up of the representatives of New Crops Research Branch, the Soil Conservation Service, the Forest Service and of the executive committees of the four regional projects and the Inter-regional Project I on potatoes, which was an outgrowth of the activities from the new plants projects. There are some items in the minutes I think should be emphasized, and there are some very short paragraphs that represent a considerable amount of discussion. In some cases I think the true point isn't

brought out as effectively as possibly we can in discussion.

There are nearly 60 pages in the report of the last meeting and I am sure there are a number of things in it that you folks should be looking at because you have asked questions in the last two days that are answered in the report. This, to me, is one of the most valuable reports of the National Coordinating Committee. In setting certain policies, I feel that some day we will have to review again some of the policies that were set 8 to 10 years ago, particularly with respect to distribution of materials. These probably should be reviewed periodically because we are a dynamic, growing, and changing group.

The very fine report that Dr. Hyland referred to from New Crops Research Branch and its two principal sections, one on the Crop Development Section and the one on the Plant Introduction Section take up the first part of this report, pages 2 to 7, followed by the reports from the Coordinators of the regions. I am not going to discuss these other than to point out that at two places in these reports there is mentioned the matter of a 10-year report. Our project now is ten years old and I suspect that perhaps we will be formally asked, before the next meeting of this group, to prepare a 10-year report of progress and accomplishments on S-9. We have a good background for that because you will remember several years ago we got together a report on the early accomplishments of S-9. Edwin James labored over that quite some time, working with a number of you in preparing Southern Regional Cooperative Series Bulletin No. 27 entitled "Progress and Potentials of Plant Introductions in the South. I suspect we'll need to bring that up to date and, as I see it, the next year's chairman and the Coordinator will have to bear the brunt of getting that report together. I would like to see our report printed again. That is going to be, as I see it, a major preparation and we are looking to our executive committee to take the leadership.

Next, I believe I would like to bring up the matter of your relationships with the directors of your stations. It has been implied that some of the directors were not favorable to this particular type of undertaking, or that there wasn't very much activity being supported. I want to point out to you that I think the key to this is in the hands of you folks that are technical committee members. If you'll make your director understand, and you can do it, what is being done and what some of your ideas are you will get better understanding and better support. Not only your directors, but you folks have given the best illustration, and I want to compliment you in attendance, of working with the other personnel at your stations. You are supposed to be the liaison folks in a pretty complete and extensive undertaking covering a wide range of plans; and you have a tremendous job, not just in doing research, but in your relationships and information. This kind of a project is quite different from so many of our regional research projects because of that peculiar function and situation in which you are in your inter-relation with a number of other workers in your own station. And I believe those of you who feel that you aren't getting quite the interest, attention, or recognition in connection with the program in your own states will have it pretty largely in your own hands, and in your own mind to correct that situation. As I talk with the directors they rather generally are very favorable.

The item that took more time than anything else in our discussions at the National Committee Meeting was the report of the subcommittee on proposals

presented to the National Committee in 1957 for national repositories to maintain valuable germ plasm of asexually propagated plants. A definite proposal was brought before the committee in 1957, and it has been considered by the directors' groups at various times. The national committee set up a sub-committee to make a special study of that.

Beginning at the bottom of page 43 is outlined fully the organization, function, policies and procedures in connection with the National Seed Storage Laboratory, and I would suggest you review them. It is the most complete compilation of policies for the Laboratory that I know of. I want to call your attention to one sentence on page 48. It states that materials in active use and turnover are not considered materials for including in this storage. Dr. Erlanson pointed out that "the policy committee of the National Seed Storage Laboratory has concluded that this is not the type of seed stock that should be stored here." This came up in connection with tomato breeder stocks and pea translocators' stocks; it applies also to this corn material.

The exchange of materials with the Soviet Union is outlined on page 49. There is considerable discussion which you may expect me to emphasize again.

I am very definitely concerned as I have expressed it to this group, and to the National Coordinating Committee on the relative emphasis that we put on crops for industrial use. Still, some 90 to 95 percent of our efforts are in connection with already established crops and for improvement of those crops. Sure, you've got a very definite objective there; but the program that Dr. Wolff has outlined gives us some more objectives towards which we as agronomists and horticulturists can work. I think the biggest lag or hurdle in the search for new crops for industrial use has been the lack of objectivity. We didn't know quite what we were working toward. When you can see some of these things identified from the standpoint of their chemical constituents, the challenge of the objectivity is presented to the rest of us as agronomists, horticulturists, plant pathologists, or entomologists, and other plant scientists that are concerned.

Attention is called to page 52 in regard to the "Code of Nomenclature for Cultivated Plants." There was considerable discussion of it, but there are very few words here on that topic. As I understand, there is an international code being developed on this, and a group in the Agricultural Research Service is supposed to be working on it. But I mention it here from the standpoint of naming new varieties. Since last year we have had problems with the naming and release of two varieties that are new in Texas. Let me discuss one of them. We proposed to put the name "Gulf" on a rye grass introduction from Uruguay; and that was the way the publicity went out, giving proper recognition of PI numbers, etc. We were subsequently informed that we were violating nomenclature procedure. The point here is that we need to be very careful about varietal names that we assign, making sure they are in accordance with the accepted rules of nomenclature and that they will be accepted as designations of seed moving in interstate commerce. The situation is very complex and confused. When you assign a name, make sure that somebody else hasn't already put a name on that crop, and see that it is cleared properly through the New Crops Research Branch and through the appropriate professional group in the Agricultural Research Service.

I think Dr. Roever raised the question about distribution of reports. There

are two motions on page 53. The first is that National Coordinating Committee reports be sent to Regional Coordinators as usual to be distributed as follows: one copy to each state experiment station director, each state representative and each administrative adviser. Secondly, copies of the minutes of the technical committee meetings, regional coordinators' annual reports, and any special reports of each region should be sent to each coordinator for distribution to administrative advisers, technical committee representatives, and for his own files. Also, five copies should be sent to the New Crops Research Branch, and two to the representative of the State Experiment Station Divisions, ARS. I think that we could send twenty copies to the Coordinator at each of the other regions, and then you should send about 40 copies to RDL.

New or Revised Contributing Projects

No new or revised projects contributing to S-9 were presented for consideration by the Committee. The Oklahoma Agricultural Experiment Station revised its contributing project and circulated it among the executive committee of S-9 for review and approval prior to this meeting. The new Oklahoma project is entitled: Introduction, Multiplication, Preservation, and Evaluation of New or Special Plants for Industrial and Agricultural Use.

Lewis: Suggested that projects be reviewed every 3 to 5 years to check on trends and revised accents.

Proposals for Repositories to Maintain Asexually Propagated Plant Materials

This topic was discussed by Dr. Lewis in his review of the April 1959 meeting of the National Coordinating Committee. For status of these proposals, refer to Dr. Lewis' review in these minutes and to the minutes of the 1959 meeting of the National Coordinating Committee.

Proposals for New Plant Explorations

Dr. Miller submitted the following proposal for domestic collection of fruits near the Gulf Coast.

LOUISIANA STATE UNIVERSITY
Agricultural Experiment Station
Baton Rouge, Louisiana

S-9 Regional Exploration Proposal
Submitted August 4, 1959

Title: Domestic Collection of Fruit Crops

Objective: To collect propagation stocks of old existing varieties of fruit found along the Gulf Coast area

Justification: In the area 150 to 200 miles from the Gulf Coast, moving north, we find very few fruits except figs,

pecans, muscadine grapes and some small fruits. Census reports and studies show there are fewer fruit crops grown in this area than probably any other given section of the country. Peaches, apples, pears and hardy citrus are found in very limited plantings. This condition is probably due to low chilling requirements for temperate fruits, and in most cases, it is too cold for most tropical fruits. However, there exist a number of individual trees of many species that are producing satisfactorily in this thermal region. It is therefore the primary object of this project to collect as many as possible of these existing fruits. In many instances the states are already making collections and evaluating these stocks in connection with their existing fruit programs. This project will supplement this work to the extent of coordinating those collections whereby all states may be benefited by any outstanding material that might be collected in this thermal region.

Plan of Work:

Collections will be made from the Gulf Coast states of Alabama, Florida, Louisiana, Mississippi and Texas as well as from Georgia and South Carolina. State extension services, private citizens and other agricultural agencies will be approached for locating promising types or specimens. A portion of all collections will be propagated at the Idlewild Farm of Louisiana State University with the cooperating states having the option of also holding duplicating portions.

All collections will be documented as to exact place of collecting, date, local or varietal names and other pertinent data and submitted to the Plant Introduction Section, New Crops Research Branch, Beltsville, Maryland through the S-9 Regional Coordinator's office. This information will become part of the permanent inventory records and used for assignment of plant introduction (P.I.) numbers.

The maintenance and evaluation phases will be coordinated by the Louisiana Experiment Station and stocks made available to interested fruit breeders in other sections of the U.S. when the original supply has been sufficiently increased. Funds for the maintenance and evaluation are not covered by this proposal, which only supports the actual collecting phase.

Supervision and
Coordination:

E. N. O'Rourke, Jr., Department of Horticulture, Louisiana State University will provide leadership for the collecting with necessary assistance by P. L. Hawthorne and J. C. Miller.

Financial Support: It is proposed that the Plant Introduction Section, New Crops Research Branch, ARS, furnish a sum of \$1,000 per year to support the collecting and documentation of the material. Such funds would be placed with the Georgia Agricultural Experiment Station which will honor vouchers submitted by state collectors and covering expenses incidental to the collecting phase only. Previous approval of the vouchers before submitting to the Georgia Experiment Station will come from the S-9 Regional Coordinator's office.

Duration: Two to three years depending upon annual progress reported and availability of plant exploration funds.

Cooperating Agencies: The Regional Plant Introduction Station, Experiment, Georgia and the pomologists and horticulturists located at the Agricultural Experiment Station headquarters in the States of Alabama, Florida, Louisiana, Mississippi, Texas, Georgia and South Carolina.

Dr. Miller moved that the above collection project be approved. Dr. Killinger seconded the motion. It was approved unanimously.

Dr. Miller moved that consideration be given to further exploration for sweet potatoes along the western coast of South America and in the South Pacific area. The motion was seconded by Dr. Reeves and then unanimously passed.

Dr. Killinger submitted the following requests from plant breeders in Florida:

From Dr. J. R. Edwardson, Dept. of Agronomy, U. of Florida, Gainesville, Fla.

"Breeding programs in both lupines and crotalaris are based on introductions, and selections and hybridization of introductions. The breeding programs would be greatly benefited by new germ plasm containing genes controlling such characters as disease resistance, insect resistance, low alkaloid content and winter-hardiness.

"I would be greatly interested in obtaining seed of Lupinus species from the Mediterranean region: Portugal, Spain, Morocco, Algeria, Lybia, Egypt, Israel, Lebanon, Syria, Turkey, Greece, Italy and the islands Sardinia, Corsica, Sicily, Crete, Cyprus, the Dodecanese and Balearic Islands.

"I would be greatly interested in obtaining seed of Crotalaria species from: Indonesia, India, Pakistan, Union of South Africa, Rhodesia, Angola, Mozambique, Madagascar, and Ethiopia.

"I would greatly appreciate your transmission of these requests to any collecting teams entering these regions."

From Dr. D. B. Linden, Dept. of Agronomy, U. of Florida, Gainesville, Fla.

"We are making a collection of the *Digitaria* species for use as a basis of a plant breeding program for improved pasture grasses. I would like to transmit through you as the Florida representative of Technical Committee S-9 a request that plant exploration teams collect species of *Digitaria*, especially the perennial types, to add to this group. There are indigenous species in most of the sub-tropic areas of the world. However, I would be especially interested in these species growing in southern Africa, particularly Union of South Africa, and also in Australia. Of course, species with potential use collected anywhere would be most welcome."

Dr. R. G. Reeves, Dept. of Genetics, Texas A&M College, College Station, Texas submitted the following request:

"New Crops for Industrial Use

- (1) We are now placing our main emphasis on new crops for industrial use and would give first priority to this category. It is difficult to be specific as to the botanical groups to be included here, but some of the important families, as judged by previous experience, are: Cruciferae, Umbelliferae, Compositae, Papaveraceae, Cucurbitaceae and Labiatae.
- (2) Bouteloua spp., especially B. curtipendula, B. gracilis, and B. hirsuta from South America and Mexico. Individual plant collections would be much more valuable than collections from several plants mixed.
- (3) Eragrostis spp. especially intermedia, spectabilis, lugens complex, from tropical and subtropical North America and from any areas in South America.
- (4) Cyamopsis tetragonoloba (Guar)
- (5) Ricinus spp. (Castor beans)
- (6) Sesamum spp. (Sesame)
- (7) Panicum coloratum and closely related species. (Not particularly interested in P. maximum.)
- (8) New types of Paspalum dilatatum and related types and derivatives. Such types previously introduced from Brazil and Bolivia have been useful, and no doubt others are to be found in South America."

Dr. Killinger moved that the above requests from Florida and Texas be brought to the attention of the New Crops Research Branch, ARS, for its consideration in planning explorations to collect new plant materials. This motion was seconded by Dr. Miller and unanimously approved by the committee.

Dr. Ralph S. Matlock, Dept. of Agronomy, Oklahoma State University, Stillwater, Oklahoma presented the following request:

"Drs. Harlan and Celarier wish to continue a strong plea for exploration(s) to parts of Africa including Sudan, Mozambique, Madagascar, Angola; the Cameroons; Iran, Afghanistan, Baluchistan, Sind, Rajasthan and Bombay; Indonesia, Philippines, New Guinea, and southern Asia for accessions of Andropogoneae. An intensive investigation initiated in 1952 at OSU involving species of Bothriochloa, Dichanthium, Capillipedium, and Sorghum reveal many forms of apparent agronomic value.

"By utilizing selected accessions and progeny from combinations of Dichanthium accessions which are vigorous, productive, and possess high quality forage with winter hardiness of certain Bothriochloa accessions, strains with drought resistance, productivity, high forage quality, winter hardiness, disease resistance, aggressive seedling development, and other desirable qualities may be found which are adapted to the Great Plains as well as the south from Florida to California."

Dr. Matlock moved that his request be included with those from Florida, Texas, and Louisiana when they are submitted to the New Crops Research Branch for consideration. Dr. Miller seconded the motion and it was unanimously approved.

Use of New Plant Materials in Academic Programs

Committee members from Oklahoma, Texas, Louisiana, South Carolina, Florida, and Tennessee reported that certain problems associated with new plant materials are under study to some degree by graduate students. Theses of some students will be based on problems with new crops. Dr. Miller stated that the National Research Council is interested in contributing to this type of academic research.

Plans for Preparation of Annual Report

Dr. Lewis stated the annual report must be submitted on a calendar year basis and should be prepared by early January. The report should be a digest of state reports and not simply a collection of state reports. It should highlight the things done. In response to a statement that the annual report is usually a duplication of materials submitted for the annual technical committee meeting, Dr. Lewis suggested that the coordinator and chairman merely ask for new significant developments and add them to the digest of technical committee reports.

Langford: Requested committee members to supply him with copies of publications on the evaluation and use of plant introductions. These publications will be used in reports to the Crop Development Section, New Crops Research Branch, ARS.

Election of Executive Committee

The nominating committee nominated Gordon B. Killinger for chairman and Wm. E. Roever for secretary of the S-9 Technical Committee. The nominees were unanimously accepted and duly elected. They will serve with the Administrative Adviser and Coordinator as the Executive Committee of S-9 during the ensuing year.

Resolution:

A motion was made by Dr. Reeves expressing appreciation to Dr. James for the facilities made available, for his personal hospitality and the many favors that made our meeting so pleasant and successful. The motion was seconded by Mr. Martin and unanimously approved.

Time and Place of Next Meeting

It was agreed that the next meeting be called at the discretion of the Executive Committee. After the meeting was adjourned, the Executive Committee chose tentatively the dates of December 1 and 2, 1960 for the next meeting of the S-9 Technical Committee. The meeting will be held at Louisiana State University, with, perhaps, a trip to the Southern Utilization Research Laboratory in New Orleans.