ANNUAL REPORT - JULY 1, 1948 - JUNE 30, 1949

1. Project: North Central Regional Project NC-7

The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and Other Purposes and for the Preservation of Valuable Germ Plasm of Economic Plants.

2. Cooperating Agencies and Principal Leaders

State Agricultural Experiment Stations	Representative
Indiana	Dr. H. H. Kramer
Illinois	Dr. C. M. Woodworth
Iowa	Dr. I. J. Johnson
Kansas	Dr. H. H. Laude
Michigan	Dr. C. M. Harrison
Minnesota	Prof. W. H. Alderman
Missouri	Dr. W. C. Etheridge
Nebraska	Dr. F. D. Keim
North Dakota	Prof. T. E. Stoa
Ohio	Dr. F. S. Howlett
South Dakota	Prof. S. A. McCrory
Wisconsin	Dr. D. C. Smith
U. S. Department of Agriculture	
Bureau of Plant Industry, Soils and Agricultural Engineering	Mr. C. O. Erlanson
Soil Conservation Service	Mr. R. M. Ross
Regional Coordinator	
Headquarters, Iowa Agricultural Experiment Station	Dr. M. M. Hoover

3. Nature of Work and Principal Results of the Year

Cooperative Research With the National Project RM:b 111 - -

Plant materials introduced to the North Central Region originate from plant explorations supported by funds allocated to the National Project RM:b 111. During the past year the explorations in the Near East and in India were completed although materials are still coming in as a result of these expeditions. The 6,150 introductions processed during the year may be broken down into the following crop groups: Cereals 2,373, fruits and vegetables 2,033, forage and pasture plants 836, fiber plants 381, ornamentals 250, specialty crops, including oil, gums, etc., 277. It is estimated that about 5,000 introductions still await processing through inspection and quarantine.

Funds from the national project were used to support the major share of the Regional Coordinator's salary, his assistant and the office staff. The national project also supports the program of research on potato introductions at the Wisconsin Station (to be designated as a National Station by action of the National Coordinating Committee).

The major phases of work under Regional Project NC-7 consist of: (a) the development of facilities at the Primary Station for the multiplication, initial evaluation, storage and distribution of plant materials from foreign and domestic sources received by the Primary Station for evaluation and preservation; (b) the establishment of secondary centers within the region for the preservation, multiplication, and care of special classes of plant materials that because of soil, climate, or other requirements can be more advantageously grown and evaluated at locations other than the Primary Station at Ames, Iowa; (c) the cataloguing of plant materials now being used by plant breeders and research workers at the various experiment stations in the region; (d) the preservation of seed stocks under conditions of controlled temperature and humidity as a safeguard against the loss of valuable germ plasm that now or at some future time may be essential in plant improvement and breeding programs; (e) regional visits by Primary Station representative.

A. Primary Station - Ames, Iowa

Land facilities of the Primary Station consist of twenty-five acres of arable land, which is being utilized in the production of newly introduced crops and approximately seventy-six acres of rough land suitable for testing and evaluation of woody species.

During the period covered by this report, a headhouse with office and two 30' x 40' greenhouse units have been constructed. These buildings were completed in February, 1949, and used for the propagation of early vegetable and forage species for field transplanting.

On July 1, 1948, the Primary Station had received 332 accessions representing approximately 40 plant species. The seed increased from these plantings was harvested, packeted, and distributed on request to research workers in the North Central Region. More than 1,500 packets representing about 50 crop species were distributed to 23 workers at experiment stations for intensive evaluation and use in experiment station crop improvement.

The number of plant accessions has continued to increase from 332 on July 1, 1948, to 2,959 on June 30, 1949. At the present time, the Primary Station is growing more than 2,000 accessions for preliminary evaluation and increase of seed. Seed produced from these plantings will be made available to research workers in the fall of 1949 for use in their breeding and crop improvements programs. Seed remaining after the requests of research workers have been filled will be retained in storage at the Primary Station for future use in the crop breeding programs of the North Central Region.

B. Secondary Regional Stations

The exacting requirements of many of the new introductions for special soil and climatic conditions make it impractical to grow these at the Primary Introduction Station at Ames, Iowa. The Regional Technical Advisory Committee has recommended that any experiment station of the region may be designated as a Secondary Station to further the work of Regional Project NC-7 if facilities such as soil, climate, or existing research programs are available to meet the special requirements of the plant species that are to be grown. Three such secondary centers of activity have been recognized and Regional 9b3 funds have been devoted to NC-7 work at these secondary stations.

Wisconsin - Sturgeon Bay

All potato introductions received by the North Central Region are grown at the Sturgeon Bay Secondary Station. The requirements for such a station are that it must have a cool climate favorable for potato production; it must have a long growing season; a short day must figure prominently during some part of the growing season; it should be out of the commercial production area.

More than 125 stocks of potatoes have been received during the year. Approximately one-half of these were obtained as Solanum seed collected in Mexico by Dr. D. S. Correll, representing the Division of Plant Exploration and Introduction. Seedlings were grown in the greenhouse at Madison for chromosome counts and for classification of the various accessions.

Requests for approximately 150 numbers of these potato tubers and seed have been supplied to potato breeders for immediate use in breeding programs.

South Dakota - Brookings

The work at the South Dakota Secondary Station consists of cataloguing, propagation, and reestablishment of fruit varieties originally obtained from Siberia. These plant materials cannot be replaced at the present time. These fruit introductions have genetic value and are believed to be some of the most winter hardy available.

Eight Experiment Stations have received materials from this collection during the past year. Apples and pears are considered of particular value in current fruit breeding programs.

Minnesota - St. Paul

The wheat disease garden at University Farm, St. Paul, has been planted continuously with wheat for more than twenty-five years. The soil in the spring of 1948 was inoculated with about two dozen isolates of Helminthosporium spp. just prior to planting and scab inoculum was sprayed on the plants at the time of heading and repeated at intervals over a three week period. Every effort was made to provide optimum conditions for heavy infestation with other diseases. Wheat accessions grown under these conditions were then examined and classified for relative resistance or susceptibility.

Approximately 2,200 accessions of spring wheat obtained from six different sources were tested in this manner and the results of the findings reported to interested cooperating agencies. A detailed summary of all selections tested is on file for others who may wish to review the data. Information of this kind is basic to a plant breeding program concerned with the development of resistant varieties.

Research in the State Stations Relating to NC-7 but Not Supported by 9b3 Funds

In the breeding programs with field, horticultural, and ornamental plants, each of the stations in the region conducts phases of work which contribute to the success of NC-7. A large number of superior strains are freely interchanged among the breeders of specific crops, making available to each the superior germ plasm either for direct multiplication and release through organized programs of seed distribution or for use as parental material for further breeding work. Each of the state stations also maintains large collections of breeding stock of the important agricultural crops. These likewise have been freely interchanged both within and between regions to make available material for further evaluation in breeding programs. The support for this research primarily is from station funds and is reported in the annual reports of the Experiment Stations. Therefore. it probably is not justifiable to duplicate the reporting of these projects as a part of Regional Project NC-7.

C. Cataloguing of Plant Materials

The Primary Station under guidance of the Regional Technical Committee has begun an inventory of plant materials now available at each experiment station in the North Central Region. A uniform plant accession card has been adopted and each plant using division of the state stations has started to catalogue the plant materials at their respective stations. When completed, this inventory will be assembled and published for distribution to research workers of the region.

The Primary Station will maintain the inventory in current form and serve as a central clearing agency for information or plant material listed by the several states.

D. Seed Storage at the Primary Station

During the past year the Primary Station has completed a seed storage room with controlled humidity and temperature. Uniform temperature of 40° and humidity of 50 percent will provide secure storage of seed stocks originating from new introductions and for foundation seed of breeding stocks originating at the State Experiment Stations of the region. The preservation of germ plasm in such a regional storage is a very important phase of the North Central Regional Project NC-7 and gives assurance to the research workers

that breeding stocks of known genetic value are available to them when needed. The seed storage provided in the present seed room has a shelf area of approximately 1,400 square feet. The seed stocks will be stored in tight containers and replenished when the seed supply is depleted or viability of the stored seed makes replenishment necessary.

E. Regional Travel and Regional Meetings.

The Coordinator has a regional travel fund that permits two or more visits to each Experiment Station during the year.

During these visits an opportunity is provided for personal exchange of information by the representative of the Primary Station with project leaders in the different states of the region. Matters of regional scope, such as plant inventories, exchange of plant materials and information relative to performance of new accessions under test are stressed during these visits. Through the coordinatio: of effort by project leaders and progress of these activities sponsored by the Primary Station that have regional application, good progress is being made toward the objectives of NC-7.

The first meeting of the National Coordinating Committee for National Project RM:b 111, Regional Projects NC-7, S-9, W-6, and NE-9, was held at Ames, Iowa, April 19-20, 1949. Representatives from all four regions and Federal cooperating agencies were present. Minutes of the National Coordinating Committee meeting are available for those individuals wishing to review the matters taken up at this meeting.

4. Application of Results and Benefits Realized

Benefits to be realized from a project such as North Central Regional Project NC-7 are difficult to measure and frequently require a long time for complete evaluation.

There was active demand on the part of research workers for new plant materials as they became available. This means that many research men are accepting these new plant materials for critical analysis. For most introduced plant materials, a period of evaluation covering several years is necessary before final recommendations can be made either for direct utilization in their present form, for further improvement, or as parental material in crosses to add specific desirable characters which they may possess to established present varieties. This project has not been in operation for a sufficiently long period of time to permit more than preliminary evaluation of new materials introduced to the region.

5. Work Planned for Next Year

During the coming year construction of a machinery storage and general utility building is planned to serve as field headquarters at the Primary Station. Field production operations will be conducted much as they were this year except for increased volume since more than 2,000 accessions of the nearly 3,000 received to date will be grown, as compared to 332 accessions that were on hand July 1, 1948.

The program of work in support of the North Central Regional Project NC-7 in the states of South Dakota, Wisconsin, and Minnesota will be continued. New projects recommended by the Technical Advisory Committee will be started during the coming year. These new projects are listed by states and titles as follows:

Kansas	Preservation and preliminary appraisal of grasses and legumes for forage, soil conservation, and other purposes. (Coop. with Nebraska)
	Maintenance of viable seed of a collection of open pollinated corn varieties.
Minnesota	Introduction, preservation, and evaluation of stone fruits of probable potential value to the North Central Region.
Nebraska	Preservation and preliminary evaluation of important native and introduced grasses considered valuable in improvement for forage and conservation purposes. (Coop. with Kansas)
	Preservation of viable seed stocks of open pollinated strains or varieties of corn.
	Preservation of alfalfa clones and seed stocks needed in regional alfalfa improvement.
North Dakota	Maintenance of viable seed of a collection of locally adapted open pollinated corn varieties.
	Preservation of physiologic races of flax rust.
Ohio	The maintenance of two or more nurseries of vegetatively propagated timothy strains possessing specific plant characteristics.

Ohio

The evaluation of the collection of approximately 1,500 accessions of domestic and wild species of tomato which originated largely in South and Central America, and the maintenance of the desirable portion of this collection along with the valuable breeding stocks developed by plant breeders.

Multiplication, preservation, and determination of potential value of pear varieties for North Central States introduced into and collected within the United States.

The dispersal of NC-7 activities to secondary centers throughout the region as planned gives assurance of the rapid evaluation of new plant materials coming into the program and also provides for the use of state facilities that would otherwise be difficult to integrate into the regional work.

6. Publications Issued

None

7. Approved: L. J. Johnson
Chairman, Technical Committee

W. V. Lambert
Regional Administrative Adviser