ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS
Supported by Allotments of the Regional Research Fund,
Hatch Act, as Amended August 11, 1955
January 1 to December 31, 1957

1. PROJECT: NORTH CENTRAL REGIONAL PROJECT NC-7

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

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

State Experiment Stations	Representatives
Iowa	I. J. Johnson, Chairman
Alaska	M. F. Babb
Illinois	E. B. Patterson
Indiana	H. H. Kramer
Kansas	R. V. Olson
Michigan	C. M. Harrison
Minnesota	A. N. Wilcox
Missouri	A. D. Hibbard
Nebraska	W. R. Kehr
North Dakota	T. E. Stoa
Ohio	F. S. Howlett
South Dakota	S. A. McCrory
Wisconsin	W. H. Gabelman
Administrative Adviser	E. F. Frolik
U. S. Department of Agriculture	
New Crops Research Branch	C. O. Erlanson, In Charge
Crop Development Section	W. E. Whitehouse
Plant Introduction Section	H. L. Hyland
State Experiment Station Div.	N. F. Farris
	W. C. Kennard
Soil Conservation Service	A. D. Stoess
Regional Plant Introduction Station	
Coordinator	W. H. Skrdla
Technical Assistant	A. F. Dodge
Plant Pathologist	E. E. Leppik

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS

a. Regional Station Program

(1) On March 1, 1957, there was a change in coordinators for the North Central Regional Project NC-7. As of that date, Dr. W. H. Skrdla assumed duties as coordinator, thus replacing Dr. Max M. Hoover, formerly the coordinator of the Project.

(2) Dr. Elmar E. Leppik reported on April 15, 1957 to assume duties as Plant Pathologist for the Regional Station. This is a newly created position for the project and the services of a Plant Pathologist will be of great value in securing pathological information on Plant Introduction material.

(3) The year 1957 was the tenth crop year since the establishment of the North Central Regional Station. It was very favorable in regard to rainfall and above average moisture was received which resulted in larger yields of seed for most crops than in recent years. Several crops were adversely affected by disease and insect pests which may be the result of the relatively wet periods encountered at certain times during the growing season. The Pathologist has obtained many notes on disease incidence which will be of considerable value in evaluating these accessions. For example, most of the Ethiopian accessions of Lathyrus were killed by Ascochyta disease before they produced seed.

(4) During the 1957 crop year, field plantings at the Regional Station consisted of 2890 accessions of 117 genera and are grouped into the major classes of crops as follows:

Crop	No. of Genera	Number of Accessions
Grasses	30	936
Legumes	12	488
Vegetables	11	1341
Ornamental & Special	64	175
Total	117	2890

This number includes biennials and perennials of all crops which were carried into the 1957 season.

Sib pollinations were made on cucumbers, squash, pumpkins, and corn. Beets, carrots, onions, and celery were grown in cages for pollination using bees, and also in the field in separated plantings. Very little seed was produced in cages because diseases wiped out most of the accessions. Seed production of these vegetables in the field was quite good, although it is considered to be open-pollinated seed.

(5) A complete statistical summary of plant accessions maintained at the Regional Station is reported in Appendix A. It shows the cumulative total of plant accessions received by the Regional Station, the number of items that have been grown successfully and are now available for distribution to research workers, the number of items, by genera that are to be grown for seed increase in 1958 and the number of seed packets that have been distributed by the Regional Station to research workers during the 1957 Calendar year.

The Regional Station is also producing woody and herbaceous planting stock of over 140 species for use in field plantings in the low rainfall areas of the North Central Region. These species are also reported in Appendix A. Interest in woody ornamentals is increasing as indicated by an increasing

number of requests by workers in higher rainfall areas.

Seven accessions of chrysanthemum introductions from Japan were received from Glenn Dale, Plant Introduction Garden and are now out on trial in several locations in the region, as well as at the Regional Station.

b. Industrial Utilization of Crops Program

(1) In 1957 there was a continued expansion in research work and production of materials concerned with the industrial use of existing and newly introduced crops.

(2) New crop plants are being sought through introduction and also through more intensive study of native species for sources of starch, oil, waxes, proteins, and fiber. This research work is closely cooperative between project leaders of the several states experiment stations and the staff of the Northern Utilization Laboratory at Peoria, Illinois. As a result of an attempt to get a flow of materials into the Utilization Laboratory, a bilateral agreement between the New Crops Research Branch and the Kansas and Nebraska Agricultural Experiment Stations was initiated in the spring of 1957. Under this agreement, these stations will grow plant materials in greater bulk than could be collected in the wild or as crop residues. The Regional Station provided seed for this purpose.

c. National Coordinating Committee Meeting

(1) The sixth meeting of the National Coordinating Committee was held in Washington, D.C. March 28-29, 1957. The committee consists of representatives from the various Regional Projects, including NC-7, NE-9, W-6. S-9 IR-1, and the New Crops Research Branch. Items of interest which were discussed at the meeting and later discussed at the NC-7 Technical Committee Meeting include the following:

(a) Preservation and Dissemination of Certain Genetic Stocks on a Regional and Inter Regional Basis.

(b) Policy on Naming and Releasing Plant Introductions After Field Trials.

(c) National Repository for Asexually Propogated Material.

d. NC-7 Regional Technical Committee Meeting

(1) The NC-7 Technical Committee met on the campus of Iowa State College on September 17-18, 1957. In connection with each annual meeting of this committee, one of the five subcommittees also holds their meeting. This year the Vegetable Crops subcommittee held their meeting on September 16, which was the first meeting of this subcommitttee since its establishment.

The subcommittees have an important function in developing state contributing projects for maintenance of germ plasm and for evaluation of plant materials by research workers in the five major crop fields.

(2) The function of the technical committee is to prepare a budget, recommend regional work projects, present requests for the collection of plant materials on a priority basis and provide technical and administrative guidance for the operations program of the Regional Plant Introduction Station. Regional funds are used for conducting the operations program of the Regional Plant Introduction Station, for travel expense of the Technical Committee and authorized crop sub-committees, for publication of research information having Regional and Inter-regional application and for partial support of state contributing projects concerned with maintenance and evaluation of introduced plant materials.

Action on all the above items was taken at the meeting. The budget for operations was increased slightly for Fiscal 1959 to cover increased cost of labor.

(3) During the past year, two changes were made in representatives on the Technical Committee. Dr. W. R. Kehr is the New representative from Nebraska, replacing Dr. L. C. Newell and Dr. W. H. Gabelman has replaced Dr. D. C. Smith from Wisconsin.

(4) As an outgrowth of action taken by the National Coordinating Committee, the following items were discussed at the 1957 NC-7 Technical Committee Meeting:

1) Preservation and Disemination of Certain Genetic Stocks on A Regional and Inter-regional Basis. To provide a better understanding of the problem and to point out certain questions which will arise in setting up such a repository, Director Kernkamp, representing the North Central Experiment Station Directors and also administrative advisor to IR-1 presented a discussion on this subject. He pointed out that there are several important questions which should have an answer before proceeding further with plans. The questions raised in his discussion include the following:

a) What do we want to store?
b) What sort of facilities are needed, such as land required and location?
c) What kind of personnel, laboratory space, etc. are needed?
d) What are the crops to be stored?
e) What are the forms in which they should be stored?

A committee to make concrete recommendations on preservation of Genetic Stocks was appointed and consists of the following members:

E. B. Patterson
H. H. Kramer
A. N. Wilcox

2) National Repository for Asexually Propagated Materials. In view of the action taken on this subject by the National Coordinating Committee, the matter was taken up for discussion by the committee after hearing a report from the committee appointed earlier in the meeting for making a study of this problem. Several members were of the opinion that propagation of all asexually propagated plants is too great an undertaking and that it should be limited to only a few fruit crops, rather than a large diverse collection. A resolution was presented which called for the appointment of a committee to work with the fruit crops subcommittee to make a survey of fruit crops suggested for inclusion in a national repository. The Coordinator would make a list of plants recommended by members of the committee and the report would be made to the Technical Committee at their next meeting in 1958. The resolution was carried.

e. Domestic Exploration in the North Central Region. During 1957, the subcommittee on fruits cooperated with the New Crops Research Branch in the collecting of raspberries and blackberries in Minnesota and Wisconsin. The exploration was made in the late summer and early fall and the material is now being catalogued and records checked.

f. State Contributing Projects. There is an increasing amount of interest and activity shown in the use of plant introduction materials by plant breeders and others interested in crop improvement work. This is partly exemplified in the project activity discussed below. Much valuable

information is being obtained.

A report of progress on projects receiving NC-7 assistance is given below. The date initiated and amount of funds provided for 1957-58 are also given.

(1) Illinois: The assembly, evaluation, and seed increase of New Introductions and genetic chromosomal tester stocks of Maize. Initiated 7/1/53, $3,500, Project 15-382.

The bulk of the genetic stocks maintained in this collection is composed of simply-inherited individual gene traits. In addition to the single-gene mutant traits, certain other stocks are maintained, including chromosome rearrangements, primary trisomics, and B-translocations. Finally, about two dozen exotics and varieties are presently maintained, chiefly for certain characters of genetic or agronomic interest which they possess.

During the past 4 years stocks of several hundred genetic traits and combinations of traits have been assembled from some 50 sources. Stocks are maintained by selfing, sibbing, or by such other means as are appropriate. In addition, all genetic stocks, as well as chromosome rearrangements, are being partially converted to the inbred lines M14, W23, and Oh 51A to confer the necessary measure of vigor and adaptation for satisfactory maintenance and use in the Corn Belt.

A complete inventory of each year's harvest is made, listing known pedigree information of each ear. On the basis of this inventory, a list of available genetic stocks is prepared annually and submitted to the Maize Genetics Cooperation News Letter, whose recipients use it as a basis for seed requests.

Several Hundred interesting new traits have been acquired since initiation of this project. The bulk of these represent either endosperm or seedling traits. These will be tested for possible allelism with each other or with similar known traits in the collection.

Work of the 1957 season was concentrated on developing new gene combinations and on mapping traits already assigned to chromosomes. Included were stocks of about 150 chromosome rearrangements, most of which are marked with traits closely linked to one or both of the points of rearrangement.

(2) Illinois: The collection, preservation, and extensive Evaluation of Trifolium, Lotus, Melilotus and Dactylis Introductions. Initiated 7/1/56, $500.

Preliminary evaluation of the above named grasses and legumes is being made to determine their potential value as forage plants for use in breeding programs in the Corn Belt States.

Melilotus: Biennial introductions were seeded at Urbana in March, 1956. During establishment and the entire growing season of the first year, annual grasses and weeds were allowed to grow to provide severe competition for the sweet clover introductions. Weeds were mowed in June. Notes were taken in 1956 and 1957.

Stand establishment of certain annual types was poor and suggests that they were not able to compete with grasses and weeds. However, certain introductions performed very well in comparison to check varieties.

Lotus: Thirty nine introductions were established in 1956 and are being checked with Empire, Viking, and Granger varieties. Data recorded during 1956 and 1957 included such characters as vigor, growth habit, leafhopper damage, flowering, seed set, winter survival and root rot. The data

is being recorded on IBM cards and will be evaluated at the end of 1958 grow season.

Dactylis: On the basis of vigor, leafiness, disease resistance and general appearance, 51 plants from 23 introductions started at Urbana in 1954 were selected and cloned. While many of these plants are inferior to existing breeding clones in adaptability, they are outstanding in at least one agronomic character and are being evaluated further as replicated clonal material.

Fifty five newer introductions were established in 1956 and are being evaluated for 3 growing seasons and data will not be summarized until the fal of 1958.

Trifolium: No Trifolium introductions were evaluated at Urbana in 1957. New introductions which have not been previously evaluated will be planted in 1958. The 1956 and 1957 data from 35 Trifolium introductions planted at Carbondale in 1956 are being summarized and will be distributed.

(3) Indiana: The Introduction and Testing for Agronomic Desirabili Disease Resistance, and Special Characteristics of Corn Introductions. Initiated 7/1/56, $1,500, Project 846.

Approximately 1000 introductions of corn currently on hand in the Regional Station seed storage were evaluated for several characteristics as described below. The work was completed in 1957.

Leaf Blight Evaluation: Of 1067 accessions tested by inoculation with mixed suspensions of spores of Helminthosporium turcicum and H. Maydis only one, PI 217407, remained uninfected. This accession is a small seeded multiple eared popcorn from Peru with very small ears. The 1957 selfed progenies remained completely resistant to repeated inoculation.

Selfing studies: A total of 6,729 self pollinations were made in 1956. Because of the abnormally high incidence of Helminthosporium, only 2,606 selfed ears developed sufficiently and many of these produced poor quality seed.

Endosperm studies: The 2,606 ears were examined for endosperm mutati and 389 were found. Among the texture variations, 113 were considered interesting enough for analysis for amylose content. All except one showed the normal range from 19.0 to 28.6% amylose. A mutant from a selfed ear of PI 183814 from Turkey gave an amylose percentage of 35.0%

Seedling tests: Of the 2,606 selfed ears, 535 progenies showed seedling mutants described as albino, cream light yellow, bright yellow, orange variegated, dwarf, ragged, necrotic, etc.

Combining ability: Data was taken on combining ability in 1956 and further tests were made in 1957.

(4) Indiana: Evaluation of Legume and Grass Introductions. Initiat 7/1/56, $900, Project 890.

New forage introduction plantings in 1957 included 40 lines of Poa species, 5 Bromus inermus, 5 Phalaris arundinacea, 25 Dactylis glomerata, and 55 Sorghum species. The lines of Poa were screened for stem rust resistance in the greenhouse.

The 2,200 alfalfa plants from 75 introductions planted in 1956 were evaluated on an individual plant basis.

The forage grass introductions, planted in 1956, were evaluated in May-July 1957. Several sources of resistance to stem rust and Scolecotrichu (streak) were found in Timothy and orchard grass introductions when 70-79% o

the regular breeding sources were susceptible. A few Bromus introductions exhibited resistance to Helminthosporium bromi in a very severe year.

(5) Iowa: Evaluation of Grasses and Legumes. Initiated 7/1/56, $500, Project 1333 - Grasses and 1048 - Legumes.

A total of 79 introductions of Dactylis glomerata, 10 of Phalaris sp and 50 Lotus sp are being evaluated for development of improved forage grasses and legumes for Iowa conditions.

None of the forage introductions under study appear adapted for direct farm use. Some, however, exhibit features which may prove of value in improving existing types. Disease resistance in all three genera, large seed in Phalaris, and good seedling vigor and stand establishment in the two grasses are examples of desirable germ plasm which may be obtained from plant introductions under observation.

(6) Kansas: Multiplication, Preservation, and Determination of Potential Value of Forage Grasses and Legumes. Initiated 7/1/49, $2,000, Project 287

In addition to materials reported on hand a year ago, some 260 accessions of grasses and 500 of legumes were planted in 1957 for screening. A large group planted prior to 1955 is ready to be discarded, a large number of the potentially adapted types having been harvested as seed or taken out clonally.

(7) Kansas: Evaluation of Legumes, Native, and Introduced, other than Alfalfa. Initiated 7/1/56, $500, Project 492.

Observation of grass and forb accessions for potential adaptation was continued. A group of 50 indiangrass plants from the 1954 evaluation block was cloned out in May, 1956. Enough seed was obtained to plant a small increase block in 1957. Little bluestem, big bluestem, and switchgrass accessions in their respective evaluation blocks are being screened with this in view in the hope that adapted "strains" may be made available during the time plant breeders may be refining the lines still further.

A large scale collection of native forage species currently under way is expected to furnish many hundred accessions that will need to be evaluated. It is planned that they be planted in the spring of 1958. Some of the older material now under observation will be discarded.

(8) Michigan: Evaluation of Peas for Horticultural Characteristics and Resistance to Root Rots and Viruses. Initiated 7/1/56, $900, Project Hatch 837.

Evaluation of 622 pea accessions for resistance to Aphanomyces root rot was completed. Many lines exhibited a low level of tolerance to the disease, and several were moderately tolerant. None was highly resistant.

The screening of pea accessions for resistance to Fusarium root rot is in progress. Marked differences in degree of susceptibility have been observed in 300 lines thus far tested. No immune lines were found.

Continued evaluation of pea introductions for resistance to Fusarium and Aphanomyces will be continued. Screening of pea introductions for resistance to virus pea streak will be undertaken.

(9) Minnesota: Introduction, Preservation and Evaluation of Stone Fruits of Probable Potential Value to the North Central Region. Initiated

7/1/50, $1,000, Project 2119 RRF, Hort 2221.

The collection of more than 700 species of and forms of stone fruits including 175 listed in the Regional Breeders Inventory, was maintained at th University of Minnesota Fruit Breeding Farm. A few of the more tender forms were kept only as tubbed trees, but most of the collection was maintained on a 4 tree basis in the orchard. Considerable repropagation was necessary because of orchard relocation, so that it will be several years before a few o the cultivars will again be represented by fruiting trees.

The study and evaluation of this material was continued, looking toward the publication of a report in 1959. All forms that fruited in 1957 were described for this purpose unless previous descriptions were complete.

Requests for material were received from one experiment station in the North Central Region, three other domestic stations, and three foreign stations. These requests were for breeding purposes or for use in virus-disease studies. Trees or budwood were supplied in every case.

(10) Nebraska: Preservation of Alfalfa Clones and Seed Stocks Needed in Alfalfa Improvement and Preliminary Evaluation of Plant Introductions. Initiated 7/1/49, $700, Project 347.

Seedlings of 58 new Plant Introductions were transplanted to the PI nursery where limited populations of other materials have been planted durin the period 1949-1957. Cuttings of 33 plant selections having apparent field resistance to the potato leafhopper in 1956 and 30 selections having apparen field resistance to the spotted alfalfa aphid in 1956 were included in a 195 clonal nursery for further evaluation. Reaction to the spotted aphid is being verified in current greenhouse tests. Twenty five new introductions were received in 1957 for transplanting in 1958, making a total of 383 received from 1949 through December 2, 1957.

(11) Nebraska: The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Accessions and Strains of Native and Exotic grasses. Initiated 7/1/49, $1,500, Project 348.

Introductions from foreign countries and domestic collections of grasses were maintained in space planted nurseries and plots and were evaluated in different ways. Selected superior clones of bromegrass, crested wheatgrass intermediate wheatgrass, tall wheatgrass, side oats grama, indian grass, big and sand bluestems, and switchgrass have been screened from thei respective accessions and are being maintained for utilization as breeding stock.

A replanting of the 1953 domestic collections of switchgrass in 195 has been used to provide correlations of first and second year data on ten characters in 1956 and 1957. A test of bluestem and switchgrass strains initiated at three locations in Nebraska in 1956 produced information in 1956 and 1957 on the general adaptation of the several different ecotypes within these grasses on different soils and different imposed fertility levels and management treatments. The strains from the more southern sourc tend to give longer yields but interactions of strains with locations and other environmental factors become evident in the second year production.

Additional plantings of introduced and domestic accessions will be made in 1958. Clonal selections will be maintained in nurseries and additional information will be obtained on established plantings.

(12) Nebraska: Introduction and Preliminary Evaluation of Legumes other than Alfalfa and Sweetclover. Initiated 7/1/56, $500, Project 542.

Of the 156 accession rows of native and foreign legume collections planted in the introduction and preliminary evaluation nursery in the spring of 1956, 42 became well enough established to produce seed in the first season. Seed of these accessions was harvested by hand and stored. Where seed remnants were available, those accessions which failed to germinate or survive the extremely dry summer were replanted in the spring of 1957.

Twenty three additional accessions were planted in the nursery in the spring of 1957. These consisted of collections made during recent months in Turkey and included species of the genera Lathyrus, Astragalus, Glycyrrhiza Trifolium, Medicago, and Onobrychis.

Preliminary evaluation of these legumes shows little promise of replacement of alfalfa or sweetclover except for special purposes. Serious consideration is being given to Sainfoin (Onobrychis sp.) because of its apparent drought resistance and adaptability for special purposes on calcareous soils. Astragalus cicer and Desmanthus illinoensis have shown vigorous growth habits and have produced large quantities of seed. However, the agronomic possibilities of these species appear to be limited.

Further expansion of the nursery as accessions become available is planned. Evaluation of accessions currently in the nursery will be continued.

(13) North Dakota: Preservation of Certain Physiologic Races of Flax Rust-Melampsora lini. Initiated 7/1/50, $500, Project Hatch 13-IR.

Uridiospores of Melampsora lini have remained viable for more than 4 years when lyophillized with calcium chloride in vacuum. During the winter 1956-57 duplicate vials of 63 races were lyophillized.

The specific pathogenicity of the various races was utilized to identify the resistance gene in F_1 plants of the backcrosses of lines carrying single genes for rust reaction with Bison. F_1 seed of the 10th-12th backcross of most of these lines was harvested in 1957.

Races were used to identify F_2 plants and to dtermine the purity of F_3 lines carrying 2 genes for resistance to North American races of flax rust. About 2500 progenies were tested.

Races of the required pathogenicity were furnished Dr. Bothun, flax breeder, who tested about 2000 single plant progenies of the varieties B 5128 Marine, Norland, and Redwood for purity. Many commercial seed lots of these varieties were mixed and contain rust-susceptible plants. Resistant progenies were bulked for increase.

Dr. Michaelson and Mr. Harpstead of the South Dakota Station were supplied with races of flax rust for their breeding programs.

About 2000 progenies of N_2 Bison grown on Long Island, N.Y. (isolated from all other varieties of flax and free of natural crossing) are being tested for induced mutations for rust resistance.

The main lines of work will be continued in 1958. A test of upwards of 2000 greenhouse grown progenies of X-ray treated Dakota for induced mutation for rust reaction is planned for the winter-spring of 1958.

(14) Ohio: The Evaluation of the Collection of Domestic and Wild Species of Tomato, and the Maintenance of the Desirable Accessions and Valuable Breeding Stocks. Initiated 7/1/49, $1,000, Project Hatch 72.

The work of collecting and classifying the available tomato accessions is being continued. In 1957 seventy-six accessions were grown. Twenty of these were foreign introductions, 46 were of older varieties and 10 are gene marker lines. Seed of 66 of these accessions has been saved and forwarded to the Regional Plant Introduction Station at Ames, Iowa. Gene marker accessions will be forwarded at a later date. It is of special interest to note

that two accessions of the species Lycopersicon peruvianum variety humifusum (L. pissisi) are known in this country. One accession, 127829, was secured; the seed multiplied; classified and placed in storage. Viable seed of the other was located this year and three plants secured. Until recently the species L. Cheesmanii has not been available in this country. A few plants of this species were grown this year. This species is apparently red-fruited although the red color is very faint. Since the publication of North Central Regional Bulletin 51, approximately 300 additional accessions have been classified for disease resistance. It is hoped that these results can be summarized and published this year.

The present work under way will be continued which consists of collecting, classifying, multiplying, and screening for disease resistance.

(15) Ohio: Multiplication, Preservation, and Determination of Potential Value of Pear Varieties of North Central States Introduced into and Collected within the United States. Initiated 7/1/49, $500, Project Hatch 73.

North Central Regional Bulletin 75 entitled "Preliminary Evaluation of New and Uncommon Pear Varieties" was published by the Ohio Agricultural Experiment Station (Res. Bul. 790) in June 1957. This evaluation includes 129 varieties including a few seedlings.

Pear varieties included in the planting, which have not been evaluate were few in number in 1957. It was necessary to reestablish on Old Home certai varieties of comparatively recent introduction from Europe, because of the considerable fire blight infection of 1956. Almost 15 new varieties have been received from the Section of Plant Introduction for future evaluation.

New Plantings of certain varieties on dwarf trees (Angers quince root and Old Home framework) will be established. Furthemore, a special subcommitt of the Fruit Crops sub-committee will study the evaluations for purpose of making recommendations for elimination of some of these varieties.

(16) South Dakota: The Collecting, Preserving, Cataloguing, Propagating and Testing of Fruit Plants having Potential Genetic Value. Initiated 7/1/49, $2,500, Project 174.

This fruit planting consists of apples, crab apples, pears, apricots, and sandcherries. Approximately three-fourths of the apples have reached a bearing age. The apricots have been producing for many years as have the sand cherries. Few of the pears have fruited as yet. These are maintained on a minimum of 2-tree basis, apricots excepted.

Information on winterhardiness, drought tolerance, fruiting habit, fruit characteristics, disease resistance and other similar material has been assembled. Root stocks have been evaluated as understock for apples and pears Combining ability when crossed with quality varieties has been studied.

A publication describing this material will be issued in 1957-58. Evaluation studies will be continued.

(17) South Dakota: The Evaluation of Forage Legumes and Grasses for adaptation to the North Central Region. Initiated 7/1/56, $1,000, Project Hatch 297.

The following introductions were sown in rows at the Highmore Experiment Station May 4, 1956:

Bromus	37 Introductions	and 13 check varieties.
Agropyron	32 "	" 24 " "

Panicum virgatum -	30 Native collections from Dr. L. C. Newell, University of Nebraska.
Bromus	199 Introductions of either annual or winter-annual nature.
Agropyron	32 Introductions and 24 wheatgrass varieties as checks.
Panicum virgatum	30 Native collections planted May 20, 1957.

Notes were made according to the schedule devised by the NC-7 Forage Crops subcommittee and in addition, seed yields of the perennial Bromus and Agropyron introductions were obtained at Brookings. Botanical specimens of unidentified species have been sent for identification to the New Crops Research Branch.

Additional notes will be taken according to the schedule as laid out. Special attention will be given to disease reaction and drought resistance.

(18) Wisconsin: Reaction of accessions of Barley (Hordeum spp.) in the World Collection of Small Grains to the yellow dwarf virus. Initiated 7/1/56 $1,000, Project 761.

An initial screening of the first 1000 entries was made in 1956. The 186 entries showing some tolerance were tested in the greenhouse during the winter. Many of these proved to be susceptible, and by repeated testing the number of promising entries was reduced to 11. While none were immune to the virus they did show a considerable tolerance.

The next group of 1200 entries was planted at 2 dates in the field in 1957 for initial screening. While growth conditions were not too favorable, yellow dwarf was present, readings were made and seed of entries showing some tolerance was saved.

Lists (or seed) of most of the promising entries from the 1956-57 tests were furnished to several workers for testing at other locations.

The entries picked out of the second group of 1200 will be tested in the greenhouse this winter, along with the best entries from last year. The next set of 1000 entries will be planted in the field next summer for preliminary observation.

4. USEFULNESS OF FINDINGS:

One of the advantages of Regional Research is to provide free exchange of information among research workers. Consequently, the better the flow of information gained on Plant Introductions among interested workers in the Region the more effective is not only the New Crops program, but also the individual cooperating research programs.

It was with great interest that the results were received from cooperators in the form of Progress reports, annual reports and questionaires. Therefore, it is felt that information on certain of the more outstanding individual introductions should be provided in this report. It is realized that many of the results are for one season only and that many factors affect the repetition of the same results in other areas. However, since performance at any one location is usually relative to other introductions or related species, there is a good chance that an outstanding introduction may also possess to a certain degree, the characteristics in other areas.

Listed below are a few of the more outstanding accessions tested in 1957 and names of cooperators who reported them. These are mostly annuals. Information on perennial crops is usually received at the end of an evaluation period and results are made available to cooperators in other ways.

Allium fistulosum

PI 208733 Cuba Segregating for resistance to pink root rot, A.E. Kehr, Iowa State College

Dalea alopecuroides

PI 231728 Iowa Resistant to spotted alfalfa aphid and sweet clover aphid. Some plants are moderately susceptible to yellow clover aphid. --R. H. Painter, Kansas State College

Helianthus annus

PI 201812 Canada Rust Resistant
204578 Turkey Ray flowered, orange-possibility of ornamental use. C. J. Franzke, South Dakota State College

Lactuca sativa

PI 169510 Turkey Resistant to root rot.--J.C. Ballard, Michigan State Univ.

PI 204706 Turkey spineless cos type-segregating for tip burn resistance
204708 Turkey " " " " " " "
206964 Turkey " " " , no bolting, no tip burn.
--B. L. Pollock, Penn State University

Melilotus officinalis

PI 178985 Turkey Has large seed size. --H. Gorz Nebraska Agr. Exp. Sta.

Trigonella foenum graecium

PI 204527 Turkey Immune to yellow clover aphid and resistant to slightly susceptible to spotted alfalfa aphid and sweet clover aphid. This introduction shows evidence of individual plants that differ appreciably from most of the population in resistance. --R. H. Painter, Kansas State College

Zea Mays

PI 167972 Turkey Both introductions appear to be resistant to stalk rot.
228275 Russia --Arne Nevala, Jacques Seed Co., Prescott, Wisc.

PI 198902 Argentina Resistant to Puccinia polysora in seedling stage. A. J. Ullstrup, Purdue, University.

PI 217407 Peru Highly resistant to Helminthosporium turcicum and H. maydis A. J. Ullstrup, Purdue University.

PI 183814 Turkey Mutant from selfed ear gave an amylose Percentage of 35.0% H. H. Kramer, Purdue, University.

PI 172332 Australia Both introductions carry excellent resistant to Puccini
163558 Guatemala Sorghi, --W. A. Russel, Iowa State College

PI 167967 Turkey All 7 accessions show characteristics for heat resistanc
181841 Lebanon All received rating of 1, which indicates the greatest
179130 Turkey resistance shown of 22 introductions tested.
186191 Uruguay ---E. J. Dollinger, Ohio Agr. Exp. Station.
186218 Argentina
200179 Israel
200180 Israel

5. WORK PLANNED FOR NEXT YEAR:

The station work plans and work load for 1958 will be about the same as for 1957. Work toward increasing new introductions, regrowing older ones for mainenance of viability and other associated field and storage activities

will be continued.

Continued efforts will be made to stimulate interest in use of plant introduction materials in breeding work, evaluation and screening. Plant materials will be supplied for this purpose and reports will be solicited at the end of the growing season.

Specific items which are planned for 1958 include the following:

a. Increase approximately 1600 accessions which were received and not yet listed on the seed list. Approximately an additional 1000 accessions now on the seed list will be grown for revitalization and seed increase.

b. Continue to make pathological observations on accessions being grown in the field and greenhouse. Studies of uncommon diseases will be made to determine their identity and possible economic importance.

c. Cooperate with the New Crops Research Branch, Northern Utilization Laboratory and others in production of materials having possible value for Industrial Utilization.

d. Assist the University of Minnesota in the maintenance of the Rubus collection made during 1957.

6. PUBLICATION ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

The publications listed below from Kansas and North Dakota contain a report on Plant Introduction Materials used and references to material being preserved by assistance from NC-7 respectively. They are listed for matter of interest only.

a. Kansas:

Peters, D. C. and Painters, R. H. 1957. A General Classification of Available Small Seeded Legumes as Hosts for Three Aphids of the "Yellow Clover Aphid Complex". Journal of Economic Entomology 50:231-235.

b. North Dakota:

1) Flor, H. H. 1956. Mutations in Flax Rust Induced by Ultraviolet Radiation. Science 124:888-899.

2) Flor, H. H. 1957. X-ray Induced Mutations for Pathogenicity in the F_1 of Race 22 x Race 1 of the Flax Rust Fungus. Phytopathology 47:11 (abstract)

3) Flor, H. H. 1957. The Vegetative Origin of A New Race of Flax Rust Fungus. Phytopathology 47:11 (abstract)

4) Flor, H. H. 1958. Mutation to Wider Virulence in Melampsori Lini (accepted for publication in Phytopathology)

c. Ohio:

Howlett, F. S. 1957. Preliminary Evaluation of New And Uncommon Pear Varieties. North Central Regional Bulletin 75.

d. Regional Station:

1) 1956 Seed List.

2) RFD.: 1,200 Varieties of Corn are Kept on Ice. Press Article concerning North Central Regional Station prepared by reporter Don Muhm, Omaha World Herald. Published November 3, 1957.

7. APPROVED:

January 15,1958
Date

I J Johnson
Chairman, Technical Committee

January 15, 1958
Date

C. F. Frolik
Regional Administrative Adviser

Appendix A

Table I

Summary of accessions received through 1957 and their present status of utilization.

Genera	Total Received (Cumulative)	Seed List 1957	To Be Grown 1958	Packet Distribu 1957
Grasses & Field Crops				
Aegilops	103	101	2	19
Agropyron	153	77	76	227
Agrostis	61	34	27	1
Alopecurus	18	4	14	12
Apera	4	3	1	1
Arrhenatherum	3	2	1	1
Beckmania	2		2	
Bouteloua	3		3	
Brachypodium	20	8	12	3
Bromus	243	111	132	144
Calamagrostis	7		7	
Cynosurus	1	1		1
Dactylis	283	112	171	189
Danthonia	2		2	
Echinochloa (Millets)	12	6	6	
Elymus	4	1	4	
Enneapogon	2	1	1	1
Eremopoa	1			
Euchlaena	1	1		1
Festuca	93	31	62	23
Helianthus	155	145	10	313
Helictotrichon	4		4	
Henrardia	1		1	
Hesperochloa	1		1	
Hordeum	5	3	2	10
Koeleria	1		1	
Lolium	129	43	86	49
Melica	2	2		
Millets (Panicum, Setaria)	194	172	22	42
Phalaris	106	46	60	23
Phacelurus	1	1		3
Phleum	42	18	24	4
Poa	53	20	33	2
Rottboellia	1		1	1
Schedonnardus	1		1	
Secale	2		2	
Sitanion	1		1	
Sorghum	11	11		4
Sporobolus	2		2	
Triodia	1		1	
Zea	1302	1251	51	836
Totals: Genera 41	3031	2205	826	1913

Appendix A

Table I continued

Genera	Total Received (Cumulative)	Seed List 1957	To Be Grown 1958	Packets Distributed 1957
Legumes				
Astragalus	27	7	20	27
Coronilla	10	3	7	13
Dalea	1	1		4
Glycine	1		1	
Hedysarum	1		1	
Lathyrus	77	61	16	24
Lotus	56	31	25	90
Medicago	326	238	88	391
Melilotus	140	86	54	270
Onobrychis	26	12	14	21
Scorpiurus	3	1	2	5
Trifolium	254	78	176	235
Trigonella	105	74	31	52
Totals: Genera 13	1027	592	435	1132
Fruits & Vegetables				
Allium	180	48	132	184
Apium	54	25	29	28
Asparagus	9	6	3	9
Beta	242	131	111	12
Cucumis	342	310	32	1000
Cucurbita	473	438	35	376
Daucus	173	101	72	18
Frageria	2		2	
Lactuca	153	137	16	298
Lycopersicon	1324	1304	20	1770
Malus	5		5	
Pisum	666	646	20	1645
Prunus	4		4	
Pyrus	4		4	
Rubus	20		20	
Spinacea	154	150	4	152
Totals: Genera 16	3805	3296	509	5492
Ornamental, Oil & Special				
Group I, Oil & Special				
Helianthus	1	1		
Mentha	15	8	7	
Rheum	6	1	5	
Totals: Genera 3	22	10	12	

Appendix A

Table I continued

Genera	Cumulative On Hand	To be Grown 1958	Total Accessions Available 1957	Plants Distribut 1957
Group II, Woody And Herbaceous Ornamentals				
Abelia	1	1		
Abies	1	1		
Acanthopanax	1	1		1
Acer	5	5		
Amorpha	2	2		
Atraphaxis	2	2		
Berberis	2	1	1	44
Betula	2	2		
Buxus	1		1	67
Callicarpa	2	2		
Calycanthus	2	2		
Caragana	3	3		
Carpinus	1	1		
Caryopteris	3	3	3	6
Ceanothus	1	1		
Cercidiphyllum (Minn.)	1	1	1	59
Cercis (Minn.)	1	1	1	35
Chaenomeles	2	2		
Chrysanthemum	7	7		
Clethra	1	1		
Colutea	1	1	1	38
Cornus	5	5	3	56
Cotoneaster	5	5	1	3
Cupressus	1	1		
Cydonia	2	2		
Dianthus	1	1		
Elaeagnus	4	4		
Elsholtzia	1	1		
Ephedra	2	2		
Euonymus	6	6	2	22
Euphorbia	1	1	1	
Exochorda	1	1		
Forsythia	1	1	1	10
Fraxinus	1	1		
Hamamelis	1	1		
Hedera	1	1	1	
Hypericum	1	1	1	6
Ilex	1	1		
Iris	1	1		
Ixia	1	1		
Larix	1	1		
Ligustrum	1	1		
Lithocarpus	1	1		1
Lonicera	2	2	2	96
Mahonia	1	1		
Malus	2	2	2	
Melicope	1	1	1	

Appendix A

Table I continued

Genera	Cumulative On Hand	To Be Grown 1958	Total Accessions Available 1957	Plants Distributed 1957
Pachistima	1	1	1	1
Philadelphus	2	2		
Photinia	1	1		
Physocarpus	1	1		
Picea	2	2		
Pinus	1	1		
Populus	9	9	9	8
Prinsepia	1	1		
Prunus	4	4		
Pyracantha	1	1		
Pyrus	2	2	1	
Quercus	3	3		3
Rhus	1	1	1	
Ribes	1	1	1	2
Rosa	2	2	2	
Rubus	11	11	11	
Salix	3	3	3	
Securinega	1	1		
Thuja	1	1		
Tilia	1	1		
Vaccinium	5	5		
Vitex	1	1		
Totals: Genera 69	143	141	52	458

Table II

Summary of Information in Table I.

Crop	Genera	Total Rec. (Cumulative)	Seed List 1957	To Be Grown 1958	Packets or Plants Dist. 1957
Grasses & Field Crops	41	3031	2205	826	1913
Legumes	13	1027	592	435	1132
Fruits & Vegetables	16	3805	3296	509	5492
Ornamental, Oil & Special					
Group I, Oil & Special	3	22	10	12	
Totals	73	7885	6103	1782	8537 8537
*Group II Woody & Herb. Ornam.	69	143	52	141	458
Totals	142	8028	6155	1923	
		Total; Seed packets and plants -			8995

*Group II, Woody and Herbaceous Ornamentals do not appear on the published seed list. A list of available stock is circulated to interested cooperators and orders are filled from their requests.