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, 1960

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
Michigan	*C. M. Harrison, Chairman
Alaska	*C. E. Logsdon
Illinois	*E. B. Patterson
Indiana	*H. H. Kramer
Iowa	*C. P. Wilsie
Kansas	*R. V. Olson
Minnesota	*A. N. Wilcox
Missouri	*A. D. Hibbard
Nebraska	*W. R. Kehr
North Dakota	*G. A. Peterson
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
New Crops Investigations	W. E. Whitehouse
World Plant Resources Investigations	H. L. Hyland
State Experiment Station Division	N. F. Farris
	W. C. Kennard
Soil Conservation Service	*A. D. Stoesz
	D. S. Douglas

North Central Regional Plant Introduction Station, Ames, Iowa

Regional Coordinator	W. H. Skrdla
Horticulturist	A. F. Dodge
Plant Pathologist	E. E. Leppik

* Voting members of NC-7 Regional Technical Committee

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS

a. Regional Station Program

(1) Production program. The year 1960 was the thirteenth crop year since the establishment of the North Central Regional Station. Moisture and temperature were generally favorable and better than average harvests were obtained for most crops. Consequently, many new items were added to the seed list. A comparison of the total 1959 and 1960 seed list inventories follows:

1960 - 9060 items
1959 - 7930 "
Increase - 1130 "

Very little winter-killing occurred during 1959-60, probably due to a heavy snow cover which lasted during the coldest temperatures. Species which we normally expect to winter-kill, like Lotus uliginosus overwintered generally in good condition.

Another large planting was made in 1960, details of which are shown in Table I which follows.

Table I. Number of genera and accessions of various crops grown at the Regional Station in 1960.

Crop	No. of genera	No. of accessions
Grasses	35	920
Legumes	17	604
Vegetables	11	1044
Ornamental	64	246
Special	15	67
Total plantings(1960)	142	2881
Accessions carried over from 1959(Field)		810
Total maintained in 1960 (Field)		3691
*Accessions grown in greenhouse(1959-60)		120
Total, field and greenhouse (1959-60)		3811

* Does not include material grown for disease work.

Notes on plant characteristics as well as disease incidence were taken several times during the season.

Carrots, onions, and celery were grown in cages where bees were used for pollination. Sib pollinations were made on cucumbers, squash, pumpkins, sunflowers and corn.

(2) Introductions received. Table II provides information on the number of introductions received in 1960 compared with 1959.

Table II. Number of genera and accessions of the various crop groups received in 1960 compared with 1959.

Crop	No. of genera	No. of accessions 1960	1959
Grasses	18	218	287
Legumes	10	103	191
Vegetables	12	517	281
Oil & Special	6	461	9
	46	1299	768

It is evident that considerably more vegetables, oil and special introductions were received. Many vegetables were collected by Dr. Elmo Davis in Europe in 1959 and by Dr. Harlan in the Near East in 1960. The increase in oil and special crops was mainly due to a shipment of Brassica and Eruca accessions formerly stored at Glenn Dale storage. They are older introductions and were shipped to this station for re-increase in view of interest shown in the genus Brassica for its oil which might be of use industrially.

(3) Plant Pathology Program. The station pathologist continued his field observations of all material planted to record what diseases were present in 1960 and to determine the grade of resistance of the plant material to our common diseases. In addition, 530 accessions of corn were inoculated with spores of Helminthosporium turcicum and Puccinia sorghi.

Special screening programs were performed with corn (200 accessions), sunflowers (75 accessions), fenugreek (100), and Lathyrus (70). Disease-free seed was obtained from originally infected seed samples in 68 cases.

Greenhouse work was continued on further studies of seed borne diseases; Cercospora traversiana on fenugreek, Ascochyta pisi on Lathyrus, Plasmopara halstedii on sunflowers, a newly imported mosaic on Melilotus, and others.

Some new diseases were detected which are new for the U. S. and evidently imported in the seed, such as Plasmopara sp. on Dimorphotheca and Puccinia sp. on Dimorphotheca. The study of these diseases is continuing.

(4) Seed Distributed by the Regional Station.

Table III. Number of seed packets and other items distributed in 1960 by the Regional Station, according to crop group (See Appendix B for further detail)

Crop	No. of packets or items
Grasses	4262
Legumes	1460
Vegetables	3090
Oil & Special	839
Total packets	9651
Ornamental (plants)	1092
Total items	10,743

It may be of interest to point out that of the 4262 packets of grass seed distributed, 2587 were of corn. This is a gratifying increase over the number distributed in 1959 (198 packets) because of the importance of corn as a crop in this region, and it is hoped that more use will be made of it in the future than was made in 1959.

(5) Woody Ornamentals Program. Five accessions of trees and shrubs were distributed in the spring to cooperators in 12 states for regional testing. Among those items distributed were three introductions which were received from the New Crops Research Branch.

The recording of the regional woody plant trial 5 year performance reports proved to be a major activity. Preliminary draft reports were prepared on 19 trees and shrubs and sent to cooperating state leaders for correction and approval. The information given in these reports is proving to be of interest to cooperating ornamental specialists and nurserymen.

(6) Public Relations. The Regional Station was host to about 250 visitors during 1960. They included representatives of other agricultural agencies, various State Experiment Stations, Commercial interests, foreign visitors, and others.

b. Evaluation Program

(1) Regional Cooperative Effort. Evaluation of plant introductions is accomplished through cooperative effort by crops workers within the region, as well as those in other regions, and the Regional Station. The source and accomplishment of these evaluations can be grouped into several categories as follows:

(a) Information reports on accession performance submitted by individual cooperators (State, Federal or private) who use the material.

(b) Progress reports on state contributing projects which receive support from NC-7.

(c) Seed contract evaluations negotiated by the coordinator with research personnel.

(d) Observational notes taken at the Regional Station.

Information obtained through these evaluations is summarized and distributed to crops workers through special reports or incorporated into the annual seed list, which receives wide distribution.

Evaluation reports received in 1960 on introductions which appear to be of possible value in some way or which possess certain characteristics are summarized in Appendix C. These reports should, in general, be considered as preliminary, because it usually takes much time and testing to learn the true value of an introduction.

Appendix C of this report will receive broad distribution among crop workers.

(2) State Contributing Projects. To assist in the methodical evaluation of a crop or crops for one or several characteristics, the NC-7 project contributes financial assistance to various state experiment stations for state projects which are contributing to the work of NC-7. Through this mutual cooperation, more information can be obtained on the value of introductions and at the same time the experiment station worker has an opportunity to evaluate more material than might otherwise be possible. Funds for state contributing projects are also used to assist with the maintenance and preservation of certain clonal material, like fruit introductions, which cannot be maintained at the Regional Station under present facilities.

In 1960, the NC-7 Regional project supported the work of 15 state contributing projects. As of June 30, 1960, support was terminated for 2 projects, one at Illinois and one at Nebraska. At the same time on July 1, 1960, support was initiated for 2 projects, one at Alaska and one at Missouri.

Contributing projects now being supported by NC-7 are at Alaska, Illinois, Indiana, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. Work covered by these projects includes the evaluation of plant introductions (in several crop categories), preservation of fruit introductions and certain valuable stocks, and preservation of strains of flax rust.

A list of projects currently supported by NC-7 appears in Appendix A.

Specific findings reported from these projects are incorporated in Appendix C and in section (3) below.

(3) "Pay-off" Introductions. On the basis of evaluation reports, it becomes evident that certain introductions have real merit, due to disease or insect resistance, various plant characteristics, and other reasons. Certain introductions may be released as varieties either with or without genetic change, or they may have contributed some valuable characteristic to a variety.

Listed below are several introductions which may be considered as pay-offs on the basis of proved performance and generally accepted use by crop workers as a source of certain characteristics.

Cucumis sativus

(a) 163213 - India. Considered an accepted source of anthracnose (Colletotrichum lagenarium) resistance. C. V. Hall and associates at Kansas State University evaluated it for resistance to this disease and reported their findings in the March, 1960, issue of Botanical Gazette. Further details are provided in Appendix C.

(b) 175111 - India. This line may also be considered a source of anthracnose resistance, as reported by C. V. Hall and associates. It was evaluated along with 163213 and further information is provided in Appendix C. J. C. Walker at Wisconsin reports that this line is being used as a parent for its anthracnose resistance.

(c) 197087 - India. According to reports received in past years, this line appears to be exceptionally valuable. It was used as a parent in developing the line SC-50 (South Carolina) which was later assigned PI 234517. SC-50 is a cross of (PI 197087 x Ashley) x Ashley. PI 197087 was collected in India by Dr. Walter Koelz in 1951 under the name "Silchar". Subsequently it was reported as being very resistant to anthracnose by Dr. W. C. Barnes at South Carolina, Dr. A. E. Kehr at Louisiana and Dr. C. V. Hall, Kansas. Dr. Barnes also reported it to be highly resistant to downy mildew and that good progress was being made in combining anthracnose resistance and downy mildew resistance with good fruit type. In 1959 Dr. Barnes reported obtaining a male sterile mutant when using this accession as a parent. It is considered to be a vigorous line with tolerance or resistance to mosaic. Conflicting reports were received on its resistance to powdery mildew.

Medicago sativa

(a) 211608 - Afghanistan. This line is showing value for several characteristics. W. F. Lehman, California and W. R. Kehr, Nebraska, report partial resistance to spotted alfalfa aphid. Dr. Lehman also reports it to be dormant to semidormant. E. L. Sorensen, Kansas, reports some tolerance or resistance to downy mildew. Kehr further reports that selections show resistance to pea aphid similar to Lahontan. I. W. Paulson, Illinois, reports that selections are being further evaluated for their reaction to leafhopper and for their fall growth.

(b) 211609 - Afghanistan. Similar to 211608.

(c) 220299 - Afghanistan - Similar to 211608. Kehr further reports that one or more seedlings from this line were resistant to both the pea and spotted aphids.

(d) 234205 - Iran. Variety "Bam". This line is vigorous, non-dormant and shows resistance to spotted aphid as reported by W. F. Lehman, California, W. R. Kehr, Nebraska, and M. H. Schonhorst, Arizona. Kehr further reports that one or more seedlings were resistant to both the pea aphid and spotted aphid.

(e) 235736 - India. "Sirsa #9" (also PI 241882). Similar to PI 234205.

Lycopersicon esculentum

(a) 127821 - Peru. J. M. Walter, Florida, reports this line to be resistant to potato virus, Y3 and possible resistance to Y4.

(b) 127824 - Peru. Same report as for 127821.

Spinacia oleracea

(a) 179590 - Belgium. Groene Van Massey No. 452. Received from Belgium, April 1, 1949. R. E. Webb and associates, Beltsville, conducted extensive tests with this line and found it to be highly resistant to spinach blight caused by strains of cucumber virus, under certain conditions. Resistance, they found, is controlled by a single dominant gene. This work was reported in the January issue of Phytopathology and further detail is provided in Appendix C.

E. D. Delwiche, California, is using this line for breeding resistance to cucumber mosaic and mildew race 2, while G. S. Pound, Wisconsin, is using it in crosses to study the inheritance of resistance to cucumber mosaic.

Zea mays

(a) 163558 - Guatemala. A white flint accession. This line carries excellent resistance to rust, Puccinia sorghi, according to W. A. Russell, Iowa, who has tested it quite extensively. A. L. Hooker, Wisconsin, reported that it possesses genes for protoplasmic resistance to rust (P. sorghi).

(b) 172332 - Australia. A yellow dent line. W. A. Russell, Iowa, reports that this line also carries excellent resistance to Puccinia sorghi, while A. L. Hooker reports that it has excellent combining ability with some well known corn belt lines. Lorin Jump and W. C. Wilcox, both of Illinois are using it in their respective breeding programs for its rust resistance.

(c) 217413 - Mexico. A white dent, flint mixture. Considered outstanding for its resistance to corn ear worm. E. V. Walter, Indiana, conducted extensive tests and found it to be highly resistant. Reports from Walter indicate that the silk may have a lethal factor. C. Q. Brown, Idaho,

is also using it in his breeding program for its earworm resistance which he describes as being due to a tight husk. He is transferring germplasm to standard inbred lines. Further information is provided in Appendix C.

c. Domestic Exploration in North Central Region

Through financial assistance from the New Crops Research Branch, domestic explorations for native species were conducted in two areas during calendar year 1960 as follows:

(1) Kansas. An exploration started in the fall of 1959 for collecting native grasses, legumes and forbs was continued in the spring of 1960. This work was completed by June 30, 1960. A total of 113 accessions, representing 19 species, were collected. Species from this collection and previous collections were sent to the Northern Utilization and Development Laboratory for chemical screening.

Other species collected will be used in the native grass and legume projects currently underway at Kansas.

(2) Alaska. Small fruit species were collected on the Kenai Peninsula, Kodiak Island, and the interior of Alaska in 1960 during the months of July and August. Interior areas covered were for the most part along the Yukon and Kuskokwim rivers, McKinley National Park, Stoney River Lake and Chandalar Lake. The species collected are members of the following genera: Fragaria, Rubus, Vaccinium, and Ribes. Also Amelanchier alnifolia, serviceberry, was collected. In addition, several other plants or seeds of species with a potential use as ornamentals were collected. These include Silene acaulis, Rhododendran lapponicum, Juniperus communis, Dianthus repens, and Corydalis semperivirens.

These are now being established in nurseries at Palmer, Alaska and will undergo evaluation, when established. Material from this collection will also be made available to small fruit breeders in the United States.

d. Evaluation of New Crops for Industrial Utilization.

In 1960, the NC-7 project participated in the evaluation of new crops having possible industrial use as sources of oils, waxes, proteins, and fiber. This research and evaluation is closely cooperative among project leaders of several state experiment stations, New Crops Research Branch, USDA-ARS, NC-7 project, and the Northern Utilization Laboratory at Peoria, Illinois. Certain crops are grown for observation at the Regional Station, but evaluations are primarily made by the cooperating states.

(1) Regional Cooperative Evaluation Work. With the assistance of seed contract funds provided by the NC-7 project, informal agreements were made with 5 states in the North Central Region to evaluate certain promising new crop species. The New Crops Research Branch recommended crops for which increase seed and cultural evaluations are needed.

States participating in the 1960 Program were Indiana, Iowa, Kansas, Minnesota, and Missouri. Evaluation data and increase seed is sent to the Regional Station. The data is summarized by the NC-7 subcommittee for Industrial Utilization and seed samples sent to Peoria for chemical analysis.

(2) Results of 1959 Evaluations. Since the 1960 evaluation data is not available at this time, results of the 1959 season will be presented. The 1959 season marked the beginning of this work for NC-7.

Analytical data of the samples is presented in Appendix D and yield evaluations are provided in Appendix E. Some of the more promising species are as follows:

Crambe abyssinica - Most locations reported this one to have fairly good agronomic characteristics and would lend itself to mechanical harvesting. The early May plantings generally produced the highest yield.

This crop is of particular interest because of the high erucic acid content of the oil. However, the report in Appendix D points out that the content of sulfur compounds will probably prove detrimental to feeding value of the meal.

It will be of interest to point out that at the request of the New Crops Research Branch, approximately 1/3 of an acre was planted in Minnesota in 1960 in order to obtain an additional quantity of seed.

Raphanus sativus - While this crop produced fairly good yields, difficulty was encountered with knocking the seed out of the pod. This crop is also of interest because of the erucic acid content of the oil.

The analytical report points out that some variability as regards location on total oil or protein content is observed. This may, in part, be caused by unfilled seeds in the samples. However, chemical composition of the oil (iodine value and erucic acid content) and meal are little affected by location, with one exception, possibly due to a low yield.

Data show that the highest yields were produced by the Crucifers. With one exception, the highest yields of the Crucifers were obtained in Minnesota.

(3) Proposed Amendment to NC-7 Project Outline for Increased Research on New Crops. At the 1960 meeting of the NC-7 Technical Committee, the research functions of the NC-7 project were discussed with respect to New Crops work. It was felt that more emphasis should be given to the research function of NC-7 in the conduct of new crops evaluation work. To accomplish this, the Committee drafted and adopted an addendum to the NC-7 project outline:

Objective 7 - To undertake the research involved in the culture and development of plants which will indicate their full potential as new and replacement crops for industrial utilization.

Procedure for Objective 7 - Plant materials will be explored for and introduced for both chemical and cultural evaluation in the search for new industrial end-uses which could be the basis for new or replacement crops for the United States. The work may involve cooperation between the Federal Utilization and Crop Units, the State Experiment Stations, and other research institutions of the region both as to chemical and cultural problems.

e. Inventory for National Repository for Clonally Propagated Material

In 1960, progress was made on obtaining an inventory of fruits in the North Central Region. With the assistance of the Chairman of the NC-7 Subcommittee on Fruits, contacts were made with all fruit breeders in the Region. Inventory cards furnished by the New Crops Research Branch were distributed as requested and the completed cards were returned to the Regional Station and in turn forwarded to the New Crops Research Branch for summary.

A total of 4500 cards were distributed to 10 states. Approximately 1750 were returned with some still outstanding. Many stations made duplicate cards and kept one set for their own file, hence we could not expect all of the 4500 cards to be returned.

4. USEFULNESS OF FINDINGS: Contributions of this program is primarily of benefit to crops workers and through them the public ultimately receives benefit by the release of new and improved crop varieties. However, much research with plant introductions is of a basic nature and they may be used as "tools" for carrying on other research.

The regional evaluation work on promising crops for industrial utilization can contribute much to Utilization Research which ultimately would benefit the public.

5. WORK PLANNED FOR NEXT YEAR: No major change for 1961 is anticipated in the work as reported above, except that more emphasis will be given to Industrial Utilization work.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR

a. Regional Station

(1) 1959 Seed list

(2) Annual reports for NC-7 Technical Committee and the State Experiment Station Division, including a summary of promising introductions.

(3) Newspaper and magazine articles which concern the station activities (written by reporters as a result of interviews).

(4) Leppik, E. E. 1960. Some viewpoints on the phylogeny of rust fungi III. Origin of grass rusts. Mycologia, 51: 512-528. Disease Report of the North Central Regional Plant Introduction Station No. 2.

(5) _____. 1960. Melilotus italica, a new host for Uromyces striatus. Plant Disease Reporter 44: 184-185. Disease Report of the North Central Regional Plant Introduction Station No. 3.

(6) _____. 1960. World distribution of Cercospora traversiana. FAO Plant Protection Bulletin, Rome, 8: 1-3. Disease Report of the North Central Regional Plant Introduction Station No. 4.

b. Illinois

No formal publications were issued during the year. A brief report on the project and a catalogue of genetic stocks appears each year in the Maize Genetics Cooperative News Letter.

c. Kansas

(1) Dutta, S. K., C. V. Hall, and E. G. Heyne. 1960. Observations on the physiological races of Colletotrichum lagenarium. Bot. Gaz. 121: 163-166.

(2) Dutta, S. K., et al. 1960. Pathogenicity of biochemical mutants of Colletotrichum lagenarium. Bot. Gaz. 121: 166-170.

d. Michigan

(1) Lockwood, J. L. 1960. Pea introductions with partial resistance to Aphanomyces root rot. Phytopathology 50: 621-624.

(2) Lockwood, J. L. and J. C. Ballard. 1960. Evaluation of pea introductions for resistance to Aphanomyces and Fusarium root rot. Quarterly Bulletin, Michigan Agricultural Experiment Station 42: 704-713.

(3) Peterson, C. E. 1960. A gynoecious inbred line of cucumber. Quarterly Bulletin, Michigan Agricultural Experiment Station 43: 40-42.

(4) Peterson, C. E. and La Moine D. Anhder. 1960. Induction of staminate flowers on gynoecious cucumbers with gibberellin A_3. Science 131: 1673-1674.

e. Minnesota

Robinson, R. G. CDAA and EPTC for weed control in crop species of potential industrial uses. Proc. North Central Weed Control Conference and Western Canadian Weed Control Conference. Page 96. Winnepeg, Manitoba. Dec., 1959.

f. Nebraska

(1) Preservation of alfalfa clones - current data were submitted to the Regional Station at Ames and included in a typewritten report submitted to Beltsville, Maryland, a copy of which was forwarded to the Chairman of the Agronomy Department and the Director of the Nebraska Agricultural Experiment Station.

(2) Detailed reports of work in progress on evaluation native grasses have been filed with the Department of Agronomy; the Director, Nebraska Agricultural Experiment Station; and with the Forage and Range Research Branch, A.R.S., USDA.

(3) Eberhart, S. A., and L. C. Newell. Variation in domestic collection of switchgrass, Panicum virgatum L. Agron. Jour. 51: 613-616. 1959.

(4) Newell, L. C., and S. A. Eberhart. Clone and progeny evaluation in the improvement of switchgrass, Panicum virgatum L. Agron. Jour.(In press) Nebr. Journal Series paper 1017.

g. North Dakota

(1) Flor, H. H. 1960. Asexual variants of Melampsora lini. Phytopathology 50: 223-226.

(2) _____. 1960. The inheritance of X-ray induced mutations to virulence in a urediospore culture of race 1 of Melampsora lini. Phytopathology 50 (In press).

7. APPROVED:

January 20, 1961
Date

C. M. Harrison
Chairman, Technical Committee

January 20, 1961
Date

E. F. Frolik
Regional Administrative Adviser

APPENDIX A

NC-7 STATE CONTRIBUTING PROJECTS, 1960-61
WHICH RECEIVE ASSISTANCE WITH REGIONAL RESEARCH FUNDS

1. Alaska: The Preservation, Multiplication and Evaluation of Indigenous Alaskan Rubus, Ribes, Vaccinium and Frageria. Initiated 7/1/60, $1000 annually. Project 74.

2. Illinois: The Collection, Preservation, and Extensive Evaluation of Trifolium, Lotus, Melilotus, and Dactylis Introductions. Initiated 7/1/56, $500 annually.

*3. Illinois: The Assembly, Evaluation, and Seed Increase of New Introductions and Genetic Chromosomal Tester Stocks of Maize. Initiated 7/1/53, $3500 annually, Project 15-382.

4. Indiana: Evaluation of Legume and Grass Introductions. Initiated 7/1/56, $900 annually. Project 890.

5. Kansas: Multiplication, Preservation, and Determination of Potential Value of Forage Grasses and Legumes. Initiated 7/1/49, $1500 annually as of July 1, 1959. Project 287.

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

7. Minnesota: Introduction, Preservation, and Evaluation of Stone Fruits of Probable Potential Value to the North Central Region. Initiated 7/1/50, $1000 annually. Project 2119 RRF, Hort 2221.

8. Missouri: The Evaluation of Introductions of Lotus corniculatus for resistance to root and crown rot. Initiated 7/1/60, $600 annually.

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

10. Nebraska: The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Accessions and Strains of Native and Exotic Grasses. Initiated 7/1/49, $1500 annually. Project 348.

*11. Nebraska: Introduction and Preliminary Evaluation of Legumes other than Alfalfa and Sweetclover. Initiated 7/1/56, $500 annually. Project 542.

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

13. 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, $1000 annually. Project Hatch 72.

14. South Dakota: The Collecting, Preserving, Cataloguing, Propagating, and Testing of Fruit Plants having Potential Genetic Value. Initiated 7/1/49, $2000 annually as of July 1, 1959. Project 174.

* Support from NC-7 Regional Project terminated on June 30, 1960.

15. Wisconsin: Reaction of Accessions of Barley (Hordeum spp.) in the World Collection of Small Grains to the Yellow Dwarf Virus. Initiated 7/1/56, $1000 annually. Project 761

APPENDIX B

Table I. Inventory and summary of accessions received through 1960.

Genera	1959 total cumulative	Removed from inventory 1960*	Received 1960	1960 net cumulative	Seed list 1960	** To be increased	Packets Distributed
GRASSES AND FIELD CROPS							
Aegilops	111	-	10	121	98	23	51
Agropyron	185	7	4	182	145	37	65
Agrostis	84	-	2	86	71	15	10
Alopecurus	30	1	4	33	20	13	37
Apera	5	-	-	5	5	0	2
Arrhenatherum	11	-	-	11	10	1	21
Bouteloua	3	-	-	3	3	0	-
Brachypodium	18	18	-	0	0	0	3
Bromus	366	2	16	380	315	65	243
Calamagrostis	9	-	-	9	6	3	3
Cynosurus	8	-	-	8	5	3	2
Dactylis	322	1	14	335	249	86	258
Danthonia	7	-	-	7	1	6	-
Echinochloa	23	6	-	17	15	2	23
Elymus	5	-	3	8	4	4	6
Enneapogon	2	-	-	2	2	0	2
Eremopoa	1	-	-	1	-	1	2
Eriachne	1	-	-	1	-	1	-
Euchlaena	1	-	2	3	2	1	12
Festuca	172	-	5	177	132	45	104
Guadiniopsis	1	-	-	1	-	1	-
Glyceria	1	-	-	1	-	1	-
Helictotrichon	4	-	-	4	1	3	4
Henrardia	1	-	-	1	-	1	-
Heteranthelium	2	-	-	2	2	0	-
Hordeum	8	1	1	8	7	1	13
Hypochaeris	1	1	-	0	0	0	-
Koeleria	7	-	-	7	1	6	-
Lolium	113	-	1	114	97	17	186
Melica	2	-	-	2	2	0	-
Milium	1	-	-	1	-	1	-
Nardus	2	-	-	2	-	2	-
Neurachne	1	-	-	1	-	1	-
Panicum	151	3	13	161	143	18	219
Pennisetum	1	-	-	1	1	0	-
Phacelurus	1	-	-	1	1	0	2
Phalaris	79	2	3	80	75	5	219
Phleum	47	-	-	47	41	6	40
Poa	51	2	2	51	46	5	20

* Removed because of transfer to other regions, to Glenn Dale Storage or loss of seed due to inability to obtain increase and/or loss of viability.

** Does not include seed list items regrown for seed increase or maintenance of viability.

Table I. Continued

Genera	1959 total cumulative	Removed from inventory 1960*	Received 1960	1960 net cumulative	Seed list 1960	** To be increased	Packets Distributed
GRASSES AND FIELD CROPS, Cont.							
Polypogon	1	-	-	1	1	0	-
Pringlea	1	-	1	2	-	2	1
Puccinellia	2	-	-	2	-	2	-
Rottboellia	1	-	-	1	-	1	-
Schedonnardus	1	-	-	1	1	0	-
Secale	6	-	-	6	4	2	-
Setaria	81	2	8	87	68	19	72
Sorghum	13	-	-	13	13	0	53
Tricholaena	2	-	-	2	2	0	-
Tridens	1	-	-	1	1	0	-
Tripsacum	-	-	1	1	-	1	1
Trisetum	3	-	-	3	3	0	1
Triticum	1	-	-	1	1	0	-
Zea							
Introductions	1471	-	110	1581	1502	79	
State O.P.Collections	205	-	18	223	223	0	
	1676		128	1804	1725		2587
TOTALS: Genera - 52	3627	46	218	3799	3319	480	4262
LEGUMES							
Anthyllis	2	-	-	2	-	2	-
Astragalus	34	1	1	34	21	13	40
Cicer	4	4	-	0	0	0	-
Coronilla	14	-	-	14	8	6	59
Dalea	3	-	2	5	2	3	1
Desmodium	1	-	-	1	1	0	-
Glycine	4	-	-	4	1	3	-
Lathyrus	89	-	2	91	17	74	8
Lespedeza	-	-	1	1	-	1	-
Listia	1	-	-	1	-	1	-
Lotus	98	3	19	114	83	31	245
Medicago	510	3	35	542	483	59	471
Melilotus	165	-	8	173	150	23	293
Onobrychis	43	-	2	45	26	19	21
Psoralea	10	-	-	10	1	9	-
Scorpiurus	7	-	-	7	7	0	1
Tetragonolobus	3	-	-	3	2	1	3
Trifolium	407	8	27	426	300	126	238
Trigonella	124	-	6	130	29	101	80
TOTALS: Genera - 19	1519	19	103	1603	1131	472	1460

* Removed because of transfer to other regions, to Glenn Dale Storage or loss of seed due to inability to obtain increase and/or loss of viability.

** Does not include seed list items regrown for seed increase or maintenance of viability.

Table I. Continued

Genera	1959 total cumulative	Removed from inventory 1960*	Received 1960	1960 net cumulative	Seed list 1960	** To be increased	Packets Distributed
FRUITS AND VEGETABLES							
Allium	213	11	62	264	99	165	222
Apium	58	3	-	55	49	6	6
Asparagus	18	-	3	21	7	14	11
Beta	239	-	24	263	238	25	32
Crepis	1	1	-	0	0	0	0
Cucumis	364	6	48	406	359	47	85
Cucurbita	472	3	23	492	453	39	449
Daucus	181	-	35	216	116	100	81
Frageria	1	1	-	0	-	-	-
Lactuca	188	-	14	202	184	18	7
Luffa	2	-	-	2	-	2	-
Lycopersicon	1491	-	117	1608	1516	92	1790
Phaseolus	19	-	17	36	-	36	9
Pisum	925	2	89	1012	922	90	339
Prunus	2	-	-	2	1	1	-
Pyrus	2	-	-	2	2	0	-
Rheum	7	-	-	7	1	6	-
Rubus	7	-	82	89	89	0	2
Spinacia	207	42	3	168	160	8	57
Vaccinium	2	-	-	2	2	0	-
TOTALS: Genera-20	4309	69	517	4847	4198	649	3090
ORNAMENTAL, OIL AND SPECIAL							
Group I. Oil and Special							
Brassica	-	-	404	404	158	246	381
Camelina	2	-	-	2	-	2	-
Chenopodium	-	-	1	1	-	1	-
Crambe	1	-	-	1	1	0	27
Cyamopsis	5	-	-	5	-	5	-
Cynara	1	-	1	2	-	2	-
Dimorphotheca	-	-	1	1	-	1	1
Eruca	-	1	34	33	18	15	34
Euphorbia	1	-	-	1	-	1	-
Guizotia	1	-	-	1	-	1	-
Helianthus annuus	198	-	20	218	210	8	263
Helianthus spp.	4	-	-	4	3	1	16
Lallemantia	2	-	-	2	-	2	-
Mentha	11	-	-	11	7	4	3
Ononis	2	-	-	2	2	0	2
Perilla	11	-	-	11	9	2	9

* Removed because of transfer to other regions, to Glenn Dale Storage or loss of seed due to inability to obtain increase and/or loss of viability.

** Does not include seed list items regrown for seed increase or maintenance of viability.

Table I. Continued

Genera	1959 total cumulative	Removed from inventory 1960*	Received 1960	1960 net cumulative	Seed list 1960	** To be increased	Packets Distributed
ORNAMENTAL, OIL AND SPECIAL							
Group I. Oil and Special. Cont.							
Ricinus	10	-	-	10	-	10	3
Robinia	1	-	-	1	1	0	-
Rosa	1	-	-	1	1	0	1
Sesamum	5	-	-	5	-	5	-
Symphytum	1	-	-	1	1	0	-
Oil & pulp crops evaluated through contract with NC-7 1960.							100
TOTALS: Genera-21	259	1	461	719	411	306	839

Group II. Herbaceous and Woody Ornamentals

Genera	Cumulative on hand	Status#	No.accessions available 1960	No.plants distributed 1960
PI Abelia	1	G	0	0
Acanthopanex	1	DP	1	5
Acer 2(PI)	5 + 1	HP	1	36
PI Agapetes	1	G	0	0
Albizzia	1	P	0	
Amorpha	2	DG	0	0
PI Aragyris	1	G	0	0
Berberis	2	G	0	0
PI Betula	3	G	0	0
PI Berchemia	1	G	0	0
PI Brachycome	1	G	0	0
PI Buxus	3	G	1	90
Caragana	3	H	1	5
PI Carpinus	1	G	0	0
Ceanothus	1	G	0	0
Cedrus	1	G	0	0
PI Chrysanthemum	95 + 18	GP	20	34
PI Coleus	23	G	0	0
PI Cornus	3	G	0	0
PI Cotoneaster	2	GH	0	0
PI Cydonia	1	G	0	0
PI Elaeagnus	1	G	0	0
Esholtzia	1	H	1	53
PI Dianthus	1	G	0	0

* Removed because of transfer to other regions, to Glenn Dale Storage, or loss of seed due to inability to obtain increase and/or loss of viability.

** Does not include seed list items regrown for seed increase or maintenance of viability.

\# D-Distributed; G-Growing at Regional Station(not distributed); H-Holding (distributed in past); P-Under Propagation.

Table I. Continued

Genera	Cumulative on hand	Status#	No.accessions available 1960	No.plants distributed 1960
ORNAMENTAL, OIL AND SPECIAL				
Group II. Herbaceous and Woody Ornamentals, Cont.				
Euonymus	6	GH	2	117
PI Euphorbia	1	H	0	0
Forsythia	1	H	0	0
Fraxinus	2	HD	2	86
Gleditsia	3	D	3	116
PI Hydrangea	1	G		
Hypericum	1	H	0	0
PI Ilex	3	G	0	0
Indigofera	1	P	0	
PI Iris	1	G	0	0
PI Ixia	1	G	0	0
Larix	1	G	0	0
PI Ligustrum	2	GD	1	35
Lonicera	2	H	0	0
PI Magnolia	2	G	0	0
PI Malus	4	G	3	151
PI Molinia	1	G	0	0
Pachystima	1	H	0	0
PI Passiflora	1	G	0	0
PI Philadelphus	2	G	0	0
PI Photinia	3	G	0	0
PI Pinus	1	G	0	0
PI Prunus	2	D	1	32
PI Pyrus	1	D	1	75
PI Quercus	2	GD	1	12
Rhododendron	3	G	0	0
Ribes	1	H	0	0
Robinia	1	H	0	0
Rosa	6	G	0	0
Rubus	1	H	0	0
Salix	2	H	0	0
Securinega	1	H	0	0
PI Shepherdia	2	H	0	0
PI Sorbus	1	G	0	0
Spiraea	2	D	2	97
PI Syringa	1	G	0	0
PI Thuja	1	D	1	39
Ulmus	1	D	1	32
PI Vaccinium	2	G	0	0
Viburnum	2	D	2	107
TOTALS: Genera-64	246		41	1092

D-Distributed; G-Growing at Regional Station (not distributed); H-Holding (distributed in past); P-Under Propagation.

Table II. Summary of information in Table I.

Crop	No. Genera	1959 total cumulative	Removed from inventory 1960	Received 1960	1960 net cumulative	Seed list 1960	To be Grown	Packets or Plants Distributed
Grasses	52	3627	46	218	3799	3319	480	4262
Legumes	19	1519	15	103	1607	1131	472	1460
Fruits & Vegetables	20	4309	69	517	4847	4198	649	3090
Ornamental, Oil & Special								
Group I.								
Oil & Special	21	259	1	461	719	411	306	839
TOTALS:	112	9804	135	1299	10,968	9059	1907	9651
Group II.*								
Ornamentals	64	201	-	-	246	41	-	1092
TOTALS:	176	10,005	135	1299	11,214	9100	1907	10,743

* 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.

NORTH CENTRAL REGIONAL
PLANT INTRODUCTION STATION
Ames, Iowa

Appendix C to Project NC-7 Annual Report for 1960

PROMISING PLANT INTRODUCTIONS FOR 1960

Through the cooperation of crops workers who obtained and evaluated plant introductions received from this station, we receive, each year, evaluation reports on material tested. These reports are herein summarized and information on accessions showing promising traits or characteristics, unusual characteristics, etc. is included. In general, accessions reported to be discarded for various reasons are not included unless the evaluation would be of particular interest.

Most of the information listed below is provided by crops workers. However, notes on agronomic and horticultural characteristics are made annually at the Regional Station on introductions grown for seed increase. The performance of certain accessions may appear to be good as observed in the nursery row. These are summarized in Part A, Regional Station Observations. Part B, Cooperator Evaluation Reports summarizes information received from crops workers in the North Central Region, as well as from other regions.

Information on these promising introductions is listed for the interest of crops workers who are encouraged to use them for further evaluation. They are also encouraged to use materials listed in the annual Seed List. One requisite for using this seed, however, is that evaluation reports be submitted on the performance of material used.

A. Regional Station Observations

1. GRASSES

a. Agropyron spp.

222958 - A. elongatum - Iran - Uniform, hardy, vigorous, very leafy, makes good fall growth, 44-48" high at harvest.

222961 - A. intermedium - Iran - Vigorous, leafy, makes good fall growth, hardy.

223322 - A. elongatum - Iran - Leafy, late, very vigorous, strong spreader, makes heavy fall growth, 30" at harvest.

229917 - A. trichophorum - Iran - looks fairly good at Ames. Quite hardy, little to no winter injury, medium vigor and leafiness, 38-48" at harvest.

249142 - A. cristatum - Portugal - Looked good at Ames, both spring and fall. Heads profusely, hardy, vigorous, no winter injury, upright, leafy, makes good fall growth, good seed producer, 28-36" at harvest.

249143 - A. desertorum - Portugal - Same as PI 249142.
249144 - A. elongatum - Portugal - Looks good at Ames, both spring and fall. Leafy, erect, vigorous, hardy, no winter injury, makes good spring and fall growth, good seeder, tall, 48-55" at harvest.
249145 - A. intermedium - Portugal - Looks good at Ames, both spring and fall. Hardy, no winter injury, vigorous, leafy, makes good fall growth, tall, 48-58" at harvest, good seeder.
249146 - A. trichophorum - Portugal - Looks fairly good at Ames. Vigorous, hardy, no winter injury 1959-60, quite leafy, 48-60" at harvest, good seeder.
250910 - A. cristatum - Iran - Looks good at Ames, both spring and fall. Leafy, vigorous, has fine leaves, hardy, no winter injury, 28" at harvest, good seeder.
251096 - A. cristatum - Yugoslavia - Similar to 250910.
251443 - A. elongatum - Turkey - Looks good at Ames. Vigorous, good fall growth, hardy, no winter injury 1959-60, tall, 60" at harvest, good seeder.
253430 - A. intermedium - Yugoslavia - Looks good at Ames, hardy, good vigor, good fall growth, leafy, 40" at harvest, good seeder.
255144 - A. cristatum - Turkey - Performed well at Ames in 1959-60, showed no winter killing or winter damage, uniform, vigorous, erect, 26-32" at harvest, good seed producer.
255145 - A. cristatum - Turkey - Similar to 255144.
255148 - A. elongatum - Turkey - Leafy, good fall growth, no winter killing or winter damage 1959-60, vigorous, 30" at harvest, good seeder.

b. Agrostis spp.

(1) Agrostis castellana. This species is not normally too hardy at Ames, but survived quite well during winter of 1959-60. However, many accessions have a very desirable appearance during the first year, or second if they survive, especially in the fall. Their dark green color and relatively low growth might suggest possible turf use if they can withstand mowing. So far, they were evaluated very little.

Listed below are some of the better appearing accessions observed at Ames. They are leafy, dark green, quite vigorous, low growing, with a desirable appearance in the nursery row, and in most cases, are good seeders.

240132 - Portugal
240133 - Portugal - spreads vigorously
240134 - Portugal - medium green
240135 - Portugal
240141 - Portugal - spreads vigorously
240143 - Portugal - This one looked exceptionally good and the best of all grown. It exhibited a strong tendency to spread in the spring of the second year which carried on through the fall. No plants were lost during the 2 year period.
240145 - Portugal

(2) Other Agrostis species.

251097 - A. alba - Yugoslavia - Had good appearance, both spring and fall. Vigorous spreader, dark green, hardy, 18" at harvest.
251098 - A. alba - Yugoslavia - Similar to 251097.
251099 - A. alba - Yugoslavia - Similar to 251097.
251250 - A. alba - Pakistan - Hardy, leafy, vigorous spreader, stoloniferous, might have possible turf use.
251524 - A. alba - Yugoslavia - Vigorous, hardy, has good spring appearance.
251568 - A. alba - Yugoslavia - Similar to 251524.
251569 - A. alba - Yugoslavia - Similar to 251524.
251570 - A. alba - Yugoslavia - Similar to 251570.
251944 - A. alba - Austria - Leafy, spreading, hardy, vigorous, might have possible turf use.
251945 - A. alba - Austria - Some question if this is A. alba. Looked excellent in 1959-60, spread vigorously, hardy, leafy, looked good both spring and fall, produced a mat of turf 2-3 inches high, leaves are a little coarse. Looks good for turf. Poor seeder.
252045 - A. sp. - Italy - Very similar to 251945 except that the leaves are finer.

c. Alopecurus spp.

(1) Alopecurus aequalis

232189 - Wyoming - Produces an abundance of seed which germinates readily to establish a thick cover of grass. However, it is indeterminate and the seed, produced on a spike, falls as soon as ripe. Thus, the tip of the inflorescence may be in bloom while the seed at the base is shattering. Vegetative portion about 7" high and 16" at harvest.

(2) Alopecurus pratensis. The 3 accessions listed below looked good throughout the season. They spread vigorously, are hardy, leafy, produce an abundance of growth and are fairly good seeders.

251380 - Iran - Rhizomatous sod former.
251525 - Yugoslavia
251660 - Yugoslavia

d. Arrhenatherum elatius. The 6 accessions from Yugoslavia listed below and 1 from Austria, are cultivated lines collected in Yugoslavia in 1958 and grown here in 1959-60. Their performance here was quite impressive, although there was no standard U. S. variety grown to check them with. Nevertheless, all 7 accessions were leafy, vigorous, hardy, apparently quite productive in the spring and fall, 32"-40" at maturity, fairly good seed producers, but shattered quite badly. These should be further evaluated for possible forage and other uses.

251415 - Yugoslavia - variable leaf width
251526 - Yugoslavia - Shatters badly
251571 - Yugoslavia - Shatters badly

251572 - Yugoslavia - Shatters badly
251573 - Yugoslavia - Shatters badly
251574 - Yugoslavia - Some shattering
251946 - Austria - Some shattering

e. Bromus spp.

109812 - B. inermis - Manchuria - Hardy, vigorous, leafy, looked good all season.
231758 - B. inermis - New Hampshire - Similar to 109812.
232233 - B. marginatus - Colorado - Looked very good in spring and fall. Shattered seed produced abundance of seedlings between rows. Hardy and vigorous, 36-40" at harvest.
234045 - B. inermis - Spain - Very good appearance in spring and fall. Hardy, vigorous, leafy, 48-52" at harvest.
235469 - B. tomentellus - Switzerland - Good appearance spring and fall. All plants survived winter 1959-60, vigorous, leafy, 28-34" at harvest.
236770 - B. marginatus - Canada - Looked good spring and fall. Abundance of seedlings between rows in fall from shattered seed. All plants survived winter 1959-60, vigorous, leafy, 36-40" at harvest, good seeder.
236772 - B. marginatus - Canada - Similar to 236770.
236773 - B. marginatus - Canada - Similar to 236770.
251105 - B. erectus - Yugoslavia - Good appearance spring and fall. All plants survived winter of 1959-60. Vigorous, leafy, 30" at harvest.
251106 - B. sp. - Yugoslavia - Good appearance spring and fall, hardy, leafy, vigorous.
251107 - B. sp. - Yugoslavia - Similar to 251106.
251381 - B. sp. - Iran - Similar to 251106.
251527 - B. inermis - Yugoslavia - Very good performer, comparing very well to Fischer check variety.
251681 - B. inermis - U.S.S.R. - Similar to 251527.
251682 - B. inermis - U.S.S.R. - Similar to 251527.
251683 - B. riparius - U.S.S.R. - Looked good spring and fall. No loss over winter, leafy, vigorous.
251804 - B. sp. - Italy - Looked good spring and fall, no winter loss. Leafy, fine textured leaves, vigorous.
251805 - B. sp. - Italy - Similar to 251804.
251806 - B. sp. - Italy - Similar to 251804.
253300 - B. sp. - Yugoslavia - Similar to 251804.
253301 - B. sp. - Yugoslavia - Similar to 251804.

f. Dactylis glomerata

235281 - France - Looked good spring and fall, little winter injury.
235471 - Switzerland - Similar to 235281.
235472 - Switzerland - Similar to 235281.
237175 - Holland - Looked good spring and fall, leafy, vigorous, little winter injury.
250927 - Iran - Looked good spring and fall. Uniform, leafy, tall, little winter injury.

250928 - Iran - Similar to 250927.
250929 - D. sp. - Iran - Looked good fall and spring, many heads, tall, uniform, leafy, abundance of seedlings between rows in fall of 1st year and spring of 2nd year.
251111 - Yugoslavia - Very good in fall and spring. Compares well with check varieties Potomac and Sterling (formerly Iowa 6). Many leaves, fine texture, uniform, bushy, many heads.
251112 - Yugoslavia - Similar to 251111, but not as uniform.
251113 - Yugoslavia - Similar to 251111, but more decumbent, coarser and later.
251418 - Yugoslavia - Good appearance spring and fall. Uniform, vigorous, leafy.
251947 - Austria - Similar to 251418.
253303 - Yugoslavia - Looked very good in spring of 2nd year. Leafy, upright, uniform, many heads, also looked good in fall.

g. Festuca spp.

234721 - F. rubra - France - Green, leafy, hardy. Looked good.
237180 - F. rubra - Netherlands - Looked good spring and fall, leafy, vigorous. May have possible turf use.
237182 - F. rubra var. commutata - Holland - Looks good. May have possible turf use.
251116 - F. elatior - Yugoslavia - Looks quite good, very leafy, uniform.
251124 - F. ovina - Yugoslavia - Looks good, leafy, vigorous, good green color.
251127 - F. ovina - Yugoslavia - Similar to 251124, but many seed heads and fewer leaves.
251128 - F. ovina - Yugoslavia - Similar to 251127.
251133 - F. rubra - Yugoslavia - Looks good spring and fall, leafy, good seeder, dark green.
251134 - F. rubra - Yugoslavia - Very leafy, light seeder.
251136 - F. sp. - Yugoslavia - Very leafy, heavy seeder.
251137 - F. sp. - Yugoslavia - Leafy, good appearance.
251138 - F. sp. - Yugoslavia - Similar to 251137.
251665 - F. rubra - Yugoslavia - Looks good spring and fall, very leafy, vigorous, good possibility for turf.
251821 - F. elatior - Austria - Looked good in spring, leafy, good seeder, vigorous.
251824 - F. rubra - Italy - Looked good in spring and fall, very leafy, dark green, good seeder.

h. Koeleria spp.

229463 - K. sp. - Iran - Looked good spring and fall, vigorous, leafy, good seeder.
229697 - K. sp. - Iran - Very leafy but light seeder. Looked good in spring and fall.
229953 - K. sp. - Iran - Fairly leafy, good.

i. Lolium spp.

234442 - L. perenne - Belgium - Looked good during 2nd season. Vigorous, late header, leafy, dark green, All plants survived winter 1959-60.
237186 - L. perenne - Holland - Similar to 234442.
255470 - L. perenne - Yugoslavia - Similar to 234442, but better seed producer and earlier.

j. Phalaris arundinacea

225116 - Germany - Looked good all season, 1st and 2nd year. Vigorous, heavy growth, very wide leaves.
235023 - Germany - Similar to 225116 but marrower leaf, shorter.
235482 - Switzerland - Similar to 225116.
235485 - Switzerland - Similar to 225116, tall type.
237724 - Germany - Similar to 225116, vigorous, wide leaves.
251426 - Yugoslavia - Similar to 225116 but more leafy.
251531 - Yugoslavia - Similar to 225116, wide leaves.
253316 - Yugoslavia - Very vigorous, tall type, very leafy, many heads, but coarse stems and leaves.
253317 - Yugoslavia - Similar to 253316.

k. Phleum pratense

234444 - Belgium - Leafy, vigorous, looks good spring and fall, 2nd year.
237190 - Holland - Similar to 234444. Many seedlings between rows.
237191 - Holland - Looks good 1st and 2nd seasons.
237280 - Denmark - Similar to 237191.
237725 - Germany - Similar to 237191.
251596 - Yugoslavia - Looks good second season.

l. Poa pratensis

206734 - Turkey - Good looking line, leafy, vigorous, many heads.
229718 - Iran - Looks good, leafy, spreading, uniform.
237282 - Denmark - Good looking, leafy, good spreader and seed producer.
241068 - Oregon - Looks very good. Vigorous, leafy, good seeder, good vigorous sod former.

2. LEGUMES

a. Medicago spp. The accessions listed below are considered as having especially good appearance, although a large percentage of the introductions grown in 1959-60 looked quite good with respect to general appearance. Hence, it was not easy to rate one over another.

251225 - M. sativa - Yugoslavia
251561 - M. sativa - Yugoslavia
251668 - M. sativa - Yugoslavia
251689 - M. falcata - Russia

B. Cooperator Evaluation Reports: As a result of evaluation and screening programs through contributing projects and individual reports from cooperators, reports were received which indicate varying degrees of promise or value for many introductions. A summary of these reports follows:

1. GRASSES

a. Agropyron spp.

(1) Agropyron cristatum. An advanced generation derived from the hybridization of clones from the Turkish Crested Wheatgrasses listed below was evaluated and selections made for three types of spike characteristics.

172691 - Turkey
180794 - Turkey

- L. C. Newell, Nebraska

(2) 197569 - A. panormitanum - Italy - Chromosome No. 2n=18
222960 - A. elongatiforme - Iran - Chromosome No. 2n=58
223323 - A. squarrosum - Iran - Chromosome No. 2n=42
223325 - A. lolioides - Iran - Chromosome No. 2n=58
237636 - A. kosanini - Turkey - Chromosome No. 2n=58

- P. Jurasits, Montana

b. Alopecurus arundinaceus

204401 - Turkey - Has good vigor, hardiness, and sod forming characteristics.

- D. H. Dawson, Michigan

c. Bromus spp.

(1) 172390 - B. erectus - Turkey - Remains densely leafy throughout the summer.

- R. B. Thornton, Beltsville

(2) The accessions listed below need further evaluation for possible adaptation to poor sites and harvest at favorable weather periods.

172392 - B. fibrosus - Turkey
229591 - B. tomentellus - Iran
229939 - B. syriacus - Iran
229940 - B. syriacus - Iran
230111 - B. sp. - Iran
230241 - B. sp. - Iran

- F. C. Elliott, Michigan

(3) The accessions listed below need further evaluation for their good fall production.

204432 - B. inermis - Turkey
204433 - B. inermis - Turkey
229940 - B. syriacus - Iran

- C. S. Hoveland, Alabama

d. Dactylis glomerata

205194 - Turkey - Best orchard grass in the group observed. Excellent vigor, survival and production.

206667 - D. glomerata hispanica - Turkey - Vigorous growth, excellent survival 2nd year.

222761 - Argentina - Very good winter forage growth.

- C. S. Hoveland, Alabama

e. Echinochloa spp.

196291 - E. crusgalli - India - Made a good seed crop in 1960. Has possibility for wildlife (birdfood) crop.

226065 - E. haploclada - Kenya - Has possibility as a wildlife crop for birdfood. It set a good seed crop and may possibly be a hay crop also.

- John Powell, Georgia

f. Elymus junceus

75737 - Russia - This accession is one of 3 basic introductions used in development of Vinall Russian Wildrye. Most, if not all, of the Russian Wildrye now grown in this country came from this introduction.

- G. A. Rogler, North Dakota

206684 - Turkey - Established in breeding nursery and approximately 6 plants selected for further evaluation.

- T. Lawrence, Sask., Canada

g. Festuca spp.

(1) 189146 - F. ovina - Netherlands - Fine, bright green, drought tolerant.

197323 - F. rubra - Sweden - Fine texture, drought and winter hardy.

200321 - F. rubra - Denmark - For turf use, very fine texture, drought and winter hardy. Holds color well during drought.

- R. J. Stadtherr, Minnesota

(2) 195447 - F. arundinacea - U. of So. Africa - Heat tolerant, quick recovery after cutting.

200321 - F. rubra - Denmark - Needs further evaluation as possible turf use.

204447 - F. arundinacea - Turkey - Good vegetative characteristics, needs further evaluation.

225824 - F. rubra - Denmark - Needs further evaluation for possible turf use.

229500 - F. arundinacea - Iran - Good vegetative characteristics, needs further evaluation.

- C. E. Watson, New Mexico

(3) 225824 - F. rubra - Denmark - Used in breeding program - vigorous, leafy and disease-free.
237182 - F. rubra var. commutata - Holland - Used in breeding program, vigorous, leafy, and disease-free.

- F. C. Elliott, Michigan

(4) 229500 - F. arundinacea - Iran - Good fall growth, only 50% summer survival.
229501 - F. arundinacea - Iran - Good fall growth
231558 - F. arundinacea - Morocco - Outstanding fall growth - Tough forage.
231560 - F. arundinacea - Morocco - Excellent early spring growth.
231561 - F. arundinacea - Morocco - Good fall and spring growth, good summer survival.
231563 - F. arundinacea - Portugal - Good growth and survival.
231564 - F. arundinacea - Portugal - Good spring growth.

- C. S. Hoveland, Alabama

(5) 234892 - F. arundinacea - Switzerland - Very leafy, good vigor.
235018 - F. arundinacea - Germany - Leafy, vigorous, late.
235036 - F. arundinacea - Sweden - Clean, leafy, late, some winter damage.

- P. N. Drolsom, Wisconsin

h. Lolium perenne. The following accessions were used in breeding program for their rust tolerance, spring vigor, and late flowering (approximately 1 July).
201185 - Netherlands 201186 - Netherlands 201187 - Netherlands

- F. C. Elliott, Michigan

i. Panicum miliaceum
171727 - Turkey - Very early but seed shatters.

The following accessions are not bad in appearance, but not outstanding. Should be tested against U. S. varieties.

170602 - Turkey	178993 - Turkey
173750 - Turkey	179383 - Turkey
177017 - Turkey	179385 - Turkey - Tall.
178992 - Turkey	179389 - Turkey - Tall.

The following accessions need further evaluation. They are early and have lodging resistance. Should be tested against U.S. varieties.
220670 - Afghanistan 223795 - Afghanistan
222811 - Iran - Good seed appearance

253718 - P. maximum - India - Might be good for luxurious, high quality forage crop. Fine stemmed, good yield.

- R. G. Robinson, Minnesota

j. Phalaris spp.

(1) Phalaris canariensis. Yield data is provided below. All lines around 2 feet tall, usually quite uniform in growth. Greatest variation in yield, stands were good.

	Lbs/A		Lbs/A
170626 - Turkey	480	*229768 - Iran	573
170633 - Turkey	477	*250097 - Egypt	515
175812 - Turkey	250	250471 - Iran	416
*177027 - Turkey	586	251274 - Egypt	442
*179398 - Turkey	797	*251390 - Iran	746
189547 - Mexico	368	251475 - Turkey	454
*223396 - Iran	592	Morocco Check variety	410

* Need further evaluation due to favorable yield.

- P. C. Sandal, North Dakota

(2) Phalaris arundinacea

209979 - Siberia - This accession needs further evaluation with respect to use for wetland pastures. It has appeared to be the most productive, most leafy, disease resistant, and latest maturing of 15 accessions of P. arundinacea which were planted in May, 1959, an organic soil.

- D. H. Dawson, Michigan

k. Poa spp.

(1) The following introductions need further evaluation for possible adaptation to poor soils:

182792 - P. compressa - Canada
182793 - P. compressa - Canada
182794 - P. compressa - Canada
204485 - P. compressa - Canada
235488 - P. pratensis - Switzerland

- F. C. Elliott, Michigan

(2) 198075 - P. pratensis - Sweden - Hardy, very similar to species commonly found near Minneapolis.

- R. J. Stadtherr, Minnesota

(3) 206734 - P. pratensis - Turkey - Plant used only as a test or diagnostic host for bromegrass mosaic virus. Systematic host of BMV.

- W. H. Sill, Kansas

l. Setaria italica

180886 - Turkey - Needs further evaluation. Should be compared with U. S. varieties as it may have more lodging resistance, although observation was made only on a single row basis.

- R. G. Robinson, Minnesota

m. Zea mays

(1) Have possible earworm resistance. Had dead larvae in the silks of some ears. It is possible they may have the earworm lethal factor in the silks and should be retested.

162571 - Argentina
231296 - Northrup King
218143 - New Mexico

The following accessions have possible earworm resistance:

174418 - Turkey

198641 - Ohio

218160 - Arizona - Crossed with sweet corn for earworm resistance, very small plants, ears large for plant size.

218161 - Arizona

218179 - Arizona

217413 - Mexico - Appears to be outstanding in its earworm resistance. Four crosses were made on sweet corn in Texas in 1959. Three were highly resistant and one average to moderately resistant. Thus, PI 217413 appears to have value in breeding for earworm resistance - 1959 report.

Nearly immune to earworm injury. No injured ears in 3 years testing. Being used in breeding work, crossed with sweet corn. The following is quoted from his letter: " . . . PI 217413 was received in 1958 for testing. All ears were free of injury then and selfed selections tested in 1959 and in 1960 have also been free. We usually find a few silks eaten at the tip but only 1 larva has fed to any extent and it died in the silks. This is the best record we have ever had on any corn." - 1960 report.

231738 - Turkey - Appears to have Sh_2 gene. Only 4 selfed ears had a few normal kernels. All others were shrunken.

- E. V. Walter, Indiana

(2) The following accessions have possibilities for high Xanthophyll and will be further evaluated for this characteristic:

162574 - Argentina	183794 - Turkey
162700 - Argentina	183803 - Turkey
162702 - Argentina	183804 - Turkey
162927 - Paraguay	185074 - Turkey
175984 - Turkey	186185 - Uruguay
177116 - Turkey	186189 - Uruguay
177651 - Syria	186191 - Uruguay
182322 - Turkey	186194 - Africa
183735 - Turkey	186217 - Argentina
183737 - Turkey	186218 - Argentina
183671 - Turkey	186229 - Uruguay
183770 - Turkey	194791 - India

198892 - Argentina
198904 - Argentina
198905 - Argentina
204829 - Turkey
204830 - Turkey
207528 - Afghanistan
212637 - Afghanistan
214188 - Canada
217408 - Iowa
217461 - Pennsylvania
217462 - New York
217479 - New York
221841 - So. Africa
221842 - So. Africa
221851 - So. Africa
221853 - So. Africa
226685 - Guatemala
229797 - Iran
239573 - Turkey
254007 - Syria

- C. O. Grogan, Mississippi

(3) 163558 - Guatemala - Tassel type, etc. indicate this material may have considerable teosinte germplasm.

- E. J. Dollinger, Ohio

(4) 167961 - Turkey - Shows resistance to smut.
171892 - Turkey - Used in breeding program as source of sterile cytoplasm.
172332 - Australia - Used for breeding purposes in germ plasm pool with corn belt lines for rust resistance.
180016 - India - Needs further evaluation for resistance to rust and smut.
221704 - Indonesia - Shows resistance to smut.
223830 - Afghanistan - Needs further evaluation for early maturing germ plasm.
236995 - Siberia - Needs further evaluation for possible early flint gene incorporation.
251881 - U.S.S.R. - Needs further evaluation for early maturing germplasm.

- Lorin Jump, Illinois

(5) The following accessions are being used as a source of prolificy. Ears were harvested from plants having 4 harvestable ears per stalk.

167999 - Turkey
168028 - Turkey
179130 - Turkey
183771 - Turkey

- Ed Cox, Iowa

(6) The following lines show promise of having good stalk quality, root strength and resistance to stalk rot:

171907 - Turkey
171908 - Turkey
171925 - Turkey
172330 - Australia
172331 - Australia
184285 - Yugoslavia
186192 - Australia
186199 - Australia
186225 - Australia
213700 - Indiana
213721 - Iowa

The following lines show resistance to Helminthosporium maydes:

213713 - Missouri
213724 - Iowa

- Wm. Ambrose, Delaware

(7) 177606 - Turkey - du mutant being maintained.
193907 - Ethiopia - Endosperm mutants (Su_2) and su' du mutants being maintained.
200297 - Yugoslavia - Unidentified mutant, probably sh, being maintained.
205102 - Japan - Found waxy in this number. It has been used as a non-recurrent parent in backcross breeding program for waxy hybrids. None used as yet in production.
222620 - Kansas - Possible value in amylose breeding program. Not yet fully evaluated.

- M. Vineyard, Illinois

(8) 200204 - France - Being used in breeding program as a very early line.

- R. I. Braun, Quebec, Canada

(9) 214279 - Canada - Used in breeding program for its extreme earliness. Silking date 6/26.
217412 - Iowa - Same as 214279. Silking date 7/1.
218039 - Holland - Same as 214279. Silking date 6/29.
245137 - U.S.S.R. - Same as 214279. Silking date 7/1.
245138 - U.S.S.R. - Same as 214279. Silking date 7/1.

- A. F. Troyer, Minnesota

(10) 217407 - Peru - Used in breeding program. A multiple earing line. Attempted to cross this one on both sweet and dent inbreds but failed because of its lateness. Will be tried again.

- Iver Jorgensen, Minnesota

(11) 251930 - U.S.S.R. - Very early
251934 - U.S.S.R. - Good stalk qualities.
251936 - U.S.S.R. - Good ear qualities.
251937 - U.S.S.R. - Adapted to area.
251938 - U.S.S.R. - Adapted to area.
251939 - U.S.S.R. - Early
251940 - U.S.S.R. - Early
251941 - Bulgaria - Early

- R. G. Ritter, Iowa

2. LEGUMES

a. Coronilla varia. Vigorous and healthy, good second year growth:
204871 - Turkey
228373 - Iran
228411 - Iran
229627 - Iran
229968 - Iran

- F. A. Quinones, New Mexico

b. Lotus spp.

(1) 161878 L. corniculatus - Argentina - Vigorous, upright, 9% winterkill. Appears promising. Selected plants multiplied for further evaluation.

206447 - L. corniculatus - Turkey - 17% winterkill. Has as erect growth habit as viking.

206896 - L. corniculatus - Turkey - Prostrate, 13% winterkill compared with 10 other introductions from Turkey, Iran, etc., which had 25-100%. Viking had 19% winterkill and Empire 30% in the same nursery.

226275 - L. mearnsii - Kenya - 2n=12. Dr. W. F. Grant, Genetics Dept., Macdonald College, crossed this with L. japonicus (Regel) Larsen also 2n=12.

- J. S. Bubar, Quebec, Canada

(2) 196539 - L. corniculatus - Italy - Fair vigor and winter survival. Range of flowering from medium to late.

- L. M. Stevenson, Ottawa, Canada

(3) About 12 selections for root rot resistance were made in 1960.

213566 - L. corniculatus - Italy
225115 - L. corniculatus - Germany
226796 - L. corniculatus - Holland
226797 - L. corniculatus - Denmark
226798 - L. corniculatus - Holland

- C. N. Hittle, Illinois

(4) 228151 - L. corniculatus - U.S.S.R. - Apparently has good forage value. Winter hardy here so far, vigorous, no evidence of disease yet, leafy, fairly rapid regrowth. Needs further evaluation.

- H. A. Schoth, Oregon

(5) 229569 - L. tenuis - Greece - Retained good vigor during hot summer.

- R. B. Thornton, Beltsville

c. Medicago sp.

(1) FC 2480 - M. falcata - - Diploid, Chromosome No.= 16.
172893 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
172984 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
172989 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
179370 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
206286 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
206453 - M. sativa - Turkey - Diploid, Chrom. No.= 16
206454 - M. sativa - Turkey - Diploid, Chrom. No.= 16.
212798 - M. sativa - Iran - Diploid, Chrom. No.= 16.
239951 - M. sativa - Iran - Diploid, Chrom. No.= 16.

- W. M. Clement, Minnesota

(2) Individual plants selected for further evaluation based on their reaction to leafhopper and on their fall growth.

167263 - M. sativa - Turkey
170543 - M. sativa - Turkey
177011 - M. sativa - Turkey
179371 - M. sativa - Turkey
193291 - M. sativa - Yugosl.
199275 - M. sativa - Portugal
204459 - M. falcata - Turkey
204591 - M. sativa - Turkey
204889 - M. sativa - Turkey
205634 - M. sativa - Argentina
206103 - M. sativa - France
206452 - M. sativa - Turkey
207494 - M. sativa - Afghan.
209090 - M. sativa - Peru
210367 - M. sativa - Iran
211608 - M. sativa - Afghan.
212858 - M. sativa - Afghan.
220808 - M. sativa - Afghan.
222113 - M. sativa - Afghan.
227370 - M. sativa - Iran
228349 - M. sativa - Iran
229570 - M. sativa - Greece
229954 - M. sativa - Iran
230225 - M. sativa -
231042 - M. sativa - India
233750 - M. falcata - Italy
234443 - M. sativa - Belgium
234788 - M. sativa - Sweden
236606 - M. sativa - France
239954 - M. sativa - Algeria
255178 - M. sativa - Poland
255962 - M. sativa -
260982 - M. sp. - Yugoslavia

205329 - M. sativa - Peru - Very good leafhopper resistance as a line. Had a score of 1.1 compared with other lines which had scores of no less than 2.0 on a 1-5 basis.

226684 - M. sativa - Guatemala - Very good leafhopper resistance as a line. Had a score of 1.2 compared with other lines which had scores of no less than 2.0 on a 1-5 basis.

- above reports from I. W. Paulson, Illinois

(3) 235245 - M. sativa - Spain - The most promising line of 12 for resistance to the clover seed chalcid. Averaged 11 chalcids per 25 racemes compared to an average of 303 chalcids per 25 racemes in a susceptible check.

Show promise for resistance to the clover seed chalcid.

173728 - M. sativa - Turkey
183404 - M. sativa - India
196219 - M. sativa - India
196220 - M. sativa - India
196221 - M. sativa - India
196225 - M. sativa - India
196231 - M. sativa - India
210763 - M. sativa - Spain
212858 - M. sativa - Afghan.
243223 - M. sativa - Iran

- M. W. Nielson, Arizona

(4) 183060 - M. sativa - India - Isolating non-hardy types for green manure purposes. This line is vigorous, produces early spring growth and makes fast recovery.

183328 - M. sativa - India - Has good vigor and good seed yield.
215595 - M. sativa - India - Shows spotted aphid resistance.

- D. B. Grissolm, Arizona

(5) One or more pea aphid resistant seedlings were selected in 1960 from the following lines:

Medicago sativa

188863 - Canada
199278 - Portugal
199281 - Portugal
201864 - Iran
204461 - Turkey
206100 -
206109 - France
207775 - England
208683 - Algeria
211609 - Afghanistan
212104 - Afghanistan
215671 - Afghanistan
219928 - Afghanistan
220530 - Afghanistan
221469 - Afghanistan
222733 - Iran
234205 - Iran
235736 - India
237231 -
239956 - Algeria

One or more seedlings were found to be resistant to both the pea aphid and spotted aphid.

Medicago sativa

188868 - Canada
190259 - Algeria
199281 - Portugal
201864 - Iran
202824 - Arabia
204461 - Turkey
206111 - France
207775 - England
211609 - Afghanistan
217419 - Denmark
219928 - Afghanistan
220298 - Afghanistan
220299 - Afghanistan
220530 - Afghanistan
220668 - Afghanistan
221469 - Afghanistan
222733 - Iran
234205 - Iran
235736 - India

Selections having a level of resistance to pea aphid similar to Lahontan.

Medicago sativa

190259 - Algeria
202824 - Arabia
205890 - France
206103 - France
206111 - France
211608 - Afghanistan
212861 - Afghanistan
217419 - Denmark
220298 - Afghanistan
220299 - Afghanistan
220668 - Afghanistan - This line had same level of resistance to spotted aphid as Lahontan.

Moderately susceptible to spotted alfalfa aphid. Comparative ratings are listed.

Medicago sativa

Buffalo, Susceptible check	9.8
204593 - Turkey	7.0
204889 - Turkey	7.5
210367 - Iran	7.5
210440 - Iraq	7.5
220808 - Afghanistan	7.5
222111 - Afghanistan	7.5
222730 - Iran	7.0
222732 - Iran	7.0
223787 - Afghanistan	6.0
223788 - Afghanistan	7.5
226471 - Iran	7.5

Have intermediate resistance to spotted aphid. Comparative ratings are listed.

Medicago sativa

Buffalo, Suscep. check	9.8	220300 - Afghan.	5.0
204891 - Turkey	5.0	220301 - Afghan.	5.5
211606 - Afghan.	4.0	220530 - Afghan.	4.5
211607 - Afghan.	5.0	222112 - Afghan.	5.5
211608 - Afghan.	5.5	222113 - Afghan.	4.0
211610 - Afghan.	4.0	228287 - Iran	4.5
212104 - Afghan.	4.5	228349 - Iran	5.0
220299 - Afghan.	4.0		

Resistant to spotted alfalfa aphid. Comparative ratings are listed.

Buffalo - Susceptible check	9.8
211609 - M. sativa - Afghanistan	2.5
Lahontan	2.6

Show resistance to leafhopper in 1960 on plants previously selected.

205329 - M. sativa - Peru	253445 - M. falcata - Yugosl.
206278 - M. sativa - Turkey	258751 - M. falcata - U.S.S.R.
243224 - M. sativa - Iran	258752 - M. falcata - U.S.S.R.
251205 - M. sativa - Yugosl.	258753 - M. falcata - U.S.S.R.
251688 - M. falcata -Russia	258754 - M. falcata - U.S.S.R.
251689 - M. falcata -Russia	260246 - M. falcata - Germany
251690 - M. falcata -Russia	262532 - M. falcata U.S.S.R.
251830 - M. falcata - Austria	

- all above reports in section (5) provided by A. E. Kehr, Nebraska

(6) Showed fairly high level of resistance to spotted alfalfa aphid in resistance tests in Bakersfield, California.

Medicago sativa

183262 - Arabia	215595 - India
196239 - India	231768 - New Hampshire
201864 - Iran	

Showed least damage and highest percentage of resistant plants in spotted alfalfa aphid resistance tests in Bakersfield, Calif.

Medicago sativa

213005 - India 226518 - Iran 228287 - Iran

- D. F. Beard, California

d. Melilotus spp.

Good vigor, leafiness, and freedom from disease.

65511 - M. officinalis - Crimea
88990 - M. officinalis - Manchuria
90031 - M. officinalis - Spain
90186 - M. alba - Manchuria
108651 - M. officinalis - Ukraine

132269 - M. officinalis - Romania
173740 - M. alba - Turkey
202040 - M. alba - Argentina
205534 - M. officinalis - Canada
205538 - M. officinalis - Nebraska

Vigorous growth during the second year.
178985 - M. officinalis - Turkey
205197 - M. officinalis - Turkey
213327 - M. officinalis - Canada

- above reports from F. A. Quinones, New Mexico

e. Trifolium spp.

(1) 163314 - T. resupinatum - India - Excellent spring forage growth, greater than commercial Persian. Somewhat stemmy.

- C. S. Hoveland, Alabama

(2) 204521 - T. fragiferum - Turkey - Close to ground. Being tested for possible lawn use.
212245 - T. repens - Czechoslovakia - Best of White Clovers planted but only fair in vigor.
226952 - T. pratense - Ethiopia - Outstanding, 12" high and 30" in spread. Healthy and vigorous.
232942 - T. repens - Hungary - Disease and insect resistant. Fair in vigor.

- F. A. Quinones, New Mexico

3. VEGETABLES

a. Allium cepa

(1) 171478 - Turkey - Milder in flavor than many plants of the sweet spanish type. Very good in salads, raw, and frying. Produced a good crop of bulbs in spite of late seeding which also kept well in storage.

- Mrs. Winfield, New York

(2) 181008 - India - Has light green anther.
211902 - Iran - White bulb, rich green glossy foliage.
211903 - Iran - do.
212075 - Afghanistan - Large flat red, mild taste.

- G. D. McCollum, Idaho

(3) 252051 - Iran - considered of unusual value because of the blue color of the anthers.

- Elmo Davis, Beltsville

b. Asparagus springerii

255621 - Puerto Rico - Tested for rust and root rot resistance. Shows tolerance.

- S. Honma, Michigan

c. Beta vulgaris

(1) 113306 - China - Aphanomyces resistant, segregating bolters; red beets.
116808 - India - Sterile plants, monogermness, annual.
174061 - Turkey - Monogerm
176429 - Turkey - Sterile plants
176875 - Turkey - Sterile plants

- R. H. Helmerick, Colorado

(2) Showing resistance to black root fungus, Aphanomyces cochlioides. Comparative ratings given.

U.S.401, Commercial check	100	
120692 - Turkey	95	
121296 - India	101	
121838 - India	100	
163181 - India	95	
164553 - India	102--Retest	103
164810 - India	100--Retest	99
165502 - India	97--Retest	91
169020 - Turkey	103--Retest	102
169031 - Turkey	99--Retest	105
172733 - Turkey	96--Retest	101
172734 - Turkey	95--Retest	99
173841 - India	104--Retest	100
173843 - India	93--Retest	102
174062 - Turkey	102--Retest	102

- C. L. Schneider, Beltsville

(3) May have partial resistance to Rhizoctonia. Needs further testing and screening.

164172 - India	174792 - India
164363 - India	175046 - India
164524 - India	176427 - Turkey
164806 - India	177271 - Turkey
172732 - Turkey	179844 - India
172735 - Turkey	179845 - India

173843 - Turkey - Not outstanding in its resistance but merits further testing.

- J. O. Gaskill, Colorado

d. Cucumis spp.

(1) Cucumis sativus

163213 - India - Resistant to Anthracnose, Colletotrichum lagenarium.
Resistant to the following races:
Kansas I, II
North Carolina II, III
Florida 56-66D
Madison II

Moderately susceptible to:
Arkansas I
Susceptible to:
North Carolina I

175111 - India - Resistant to Anthracnose, Colletotrichum lagenarium.
Resistant to the following races:
Kansas I, II
North Carolina I, II, III
Florida 56-66D
Madison II
Arkansas I
Susceptible to none tested.

197087 - India - "Silchar" - Resistant to Anthracnose, Colletotrichum lagenarium.
Resistant to the following races:
Kansas I, II
North Carolina II, III
Florida 56-66D
Madison II
Resistant to moderate to:
North Carolina I
Arkansas I

- C. V. Hall, Kansas

(2) Used in breeding program for its resistance to angular leaf spot.
Cucumis sativus
171603 - Turkey 227209 - Japan 234517 - So. Carolina(SC-50)

- J. L. Weigle, Colorado

(3) 175111 - C. sativus - India - Being used as a parent for Anthracnose resistance.

- J. C. Walker, Wisconsin

(4) Need further evaluation for earliness for outdoor culture in Alaska.
Cucumis sativus
179260 - Turkey 197085 - India 197086 - India

- Arvo Kallio, Alaska

(5) 179676 - C. sativus - India - Very vigorous. Fruit set on only one plant. No viable seed found in any fruit. Used as pollen parent in breeding work.
- R. F. Foley, Idaho

(6) 192940 - C. sativus - China - Showed very little infection with angular leaf spot.

- C. A. John, Ohio

(7) 197087 - C. sativus - India - Very good vigor, good resistance to mildew.

- Paul Thomas, California

(8) 197087 - India - Used in breeding program for its Anthracnose resistance.
200818 - C. sativus - Burma - Used in breeding program as a source of bacterial wilt.
212233 - C. sativus - South Carolina - Used in breeding program for its powdery mildew resistance.

- C. E. Peterson, Michigan

(9) 227208 - C. sativus - Japan - Still being used in breeding program for its partial resistance to powdery mildew. Has long fruit, roots are tolerant to strong fertilizer concentrations. Young plants survived high concentration of commercial fertilizer which destroyed the main roots of young cucumber plants of American varieties.

- J. C. Gilbert, Hawaii

e. Cucurbita spp.

(1) Have a high mean level of resistance to cucumber beetle feeding. Comparative ratings given on basis of 0-3 when 0= immune and 3= highly susceptible.

135394 - C. pepo - Afghanistan	less than	1
169430 - C. pepo - Turkey	"	1
169436 - C. pepo - Turkey	"	1
177375 - C. pepo - Turkey	"	1
194268 - C. maxima - Ethiopia	"	1
216032 - C. pepo - India	"	1
222247 - C. pepo -	"	1
230181 - C. pepo - Turkey	"	1
234617 - C. pepo - So. Africa	"	1

- C. V. Hall, Kansas

(2) Need further evaluation. Appear resistant to downy mildew and tolerant to powdery mildew. High total solids. Hope to cross with C. moschata.

163227 - C. maxima - India	Total solids	11.6%
171615 - C. maxima - Turkey	"	14.0%
201772 - C. okechobeensis - Florida	"	12.0%
234612 - C. maxima - So. Africa		14.0%

Shape and outside color, poor.

169440 - C. maxima - Turkey - used in breeding program, crossed with a C. moschata inbred to be further tested. Appears resistant to powdery and downy mildew.

178985 - C. maxima - Turkey - Used in breeding program. Crossed with a C. moschata inbred to be further tested. Very high in total solids - 14.4%
192942 - C. moschata - China - Crossed with proven inbreds and will be further tested as F_1 hybrid. High in total solids - 13.5% and water insoluble solids - 6.6%.

- H. H. Reichman, Illinois

(3) 169412 - C. moschata - Turkey - Productive, good interior color.

- Paul Thomas, California

(4) 176962 - C. pepo (naked seed) - Turkey - Segregating for fruit size and shape. Several selections were saved for further study. This line is productive and vigorous.
209783 - C. pepo (naked seed) - Germany - Most productive and promising seed saved for further study and planting.

- A. D. Hibbard, Missouri

(5) 265557 (formerly 199508) - C. maxima - Argentina - Will be evaluated further because of its fine bush type.

- R. F. Foley, Idaho

f. Daucus carota

(1) 163238 - India - Central florets purple.
163239 - India - Extremely vigorous but poor quality.
163240 - India - Vigorous chantenay type, poor quality.
164388 - India - Roots pink.
167211 - Turkey - Light purple flowers.
169485 - Turkey - Vigorous, very long orange roots but large yellow core.
169488 - Turkey - Good vigor and type but yellow core.
169489 - Turkey - Good vigor and type but yellow core.

- G. D. McCollum, Idaho

(2) 187237 - Belgium - Distinctive flavor, nantes type, smooth, uniform tops.

- Paul Thomas, California

(3) 232073 - Var. Cape Market - So. Africa - Used in breeding program, shape variable, intermediate to tapering, color fair, several roots being used in breeding program.

- R. L. Engle, Wisconsin

g. Lactuca sativa

(1) Appear to have some resistance to root rot.

165492 - India - Early bolting.
169510 - Turkey - Late bolting.
171669 - Turkey - Early bolting. Used for breeding for root rot resistance. Combined with G. L. 456. In F_2 produces some fairly resistant root rot plants. All more so than G. L. 456.
174229 - Turkey - do. 171669.
175739 - Turkey - Late bolting. Combined with G. L. 456. Used for breeding root rot resistance in head lettuce.
176587 - Turkey - Early bolting. do. 175739.
178922 - Turkey - Early bolting.
204706 - Turkey - Early bolting.
212015 - Iran - Early bolting.

- M. H. Dickson, Ontario, Canada

(2) Segregating for reaction to tip burn. Chinese cabbage type but heads remained soft. Texture coarse but not bitter.

204706 - Turkey 204708 - Turkey

- L. H. Lyall, Ottawa, Canada

h. Lycopersicon spp.

(1) 126410 - L. esculentum - Peru - Showing excellent resistance to potato virus Y4. Needs further study.
127821 - L. esculentum - Peru - Several plants in accession never developed symptoms from repeated inoculations with Y4. Need further study. Considered resistant to potato virus Y3.
127824 - L. esculentum - Peru - do. 127821
128887 - L. esculentum - France - Resistant to potato virus Y.

- J. M. Walter, Florida

(2) 126445 - L. hirsutum - Peru - Used in Mosaic studies.

- S. Honma, Michigan

(3) 126928 - L. peruvianum - Peru - Used in breeding as a source of Tobacco Mosaic Virus.
212407 - L. peruvianum - Peru - Same as 126928.

- L. F. Ounsworth, Ontario, Canada

(4) 126944 - L. peruvianum - Peru - Apparently heterozygous resistance to verticillium wilt. This confirms observations made in 1943 and suggests this species as a possible source of a gene or genes for verticillium resistance in addition to that now known.

- Paul Smith, California

(5) Being used to study the nature of resistance to tobacco mosaic virus.
166989 - L. esculentum - Turkey
183692 - L. esculentum - Turkey
253673 - L. esculentum - Dr. Holmes

- G. S. Pound, Wisconsin

(6) 211408 - L. pimpinellifolium - Peru - Shows promise of possessing genes needed in a breeding program to develop varieties resistant to a new race of Fusarium wilt fungus.
212403 - do. 211408

- L. J. Alexander, Ohio.

(7) 204996 - L. esc. x L. pimp. - W. Virginia - Obtained late blight resistance by crossing with Pritchard and with Fireball.
262910 - L. esculentum - Spain - Was crossed with a male sterile and F_1 looked promising.

- T. M. Currence, Minnesota

(8) 235673 - L. esculentum - Dr. Holmes - Used in crossing with commercial tomato lines as a source of resistance to T or V. Resistance to intermal browning and gray wall seems likely.

- H. H. Murakishi, Michigan

(9) 262998 - L. esculentum - Holland - Dark red firm fruit, good fruit set.

- R. B. O'Keefe, Nebraska

i. Pisum sativum

(1) Have partial resistance to Aphanomyces eutiches. Expressed most resistance in foliage. Resistance was consistent under many and varied condition. Relative ratings are listed.

Miragreen Check	7.6
166159 - India	2.7
167250 - Turkey	3.1
169604 - Turkey (Selection)	4.1
180693 - Germany (Selection)	3.8
180702 - Germany (Selection)	5.2
180868 - Turkey (Selection)	4.8
184129 - Yugoslavia (Selection)	4.5

- J. L. Lockwood, Michigan

(2) 244120 - Holland - Not outstanding, except for branching at ground line to make 4 vines.

- C. H. Dearborn, Alaska

j. Spinacia oleracea

(1) Being used to study the nature of resistance to beet mosaic virus.

103063 - China	166366 - India
165560 - India	171865 - Turkey
165994 - India	179590 - Belgium

- G. S. Pound, Wisconsin

(2) 179590 - Belgium - "A spinach variety recently introduced from Belgium was found highly resistant to spinach blight at temperatures up to 28° C. Inoculations of progenies of crosses of resistant PI 179590 and the susceptible variety Bloomsdale indicated that resistance is controlled by a single dominant gene. Assays of resistance of PI 179590 and Virginia Savoy in relation to strains of cucumber virus 1 indicate that there are strains of the virus to which there is little or no resistance at present." - R. E. Webb, Bruce A. Perry, Henry A. Jones, and D. M. McLean. A new source of resistance to Spinach blight. Phytopathology 50: 54-56, January, 1960.

(3) 174385 - Turkey - High yielding and vigorous.
176371 - Italy - Low oxalic acid content.
176772 - Turkey - Low oxalic acid content.

- P. H. Massey, Virginia

4. OIL AND SPECIAL

a. Helianthus annuus

(1) Appear to be fair silage types, but need more evaluation.

162454 - Uruguay	170420 - Turkey
170386 - Turkey	172908 - Turkey
170391 - Turkey	176972 - Turkey
170400 - Turkey	223370 - Iran
170401 - Turkey	223671 - Iran
170402 - Turkey	232905 - Hungary
170408 - Turkey	250850 - Iran

- S. A. Thies, Montana

(2) 177403 - Turkey - Used in breeding program. Selected white seeded plants of good type and have continued selection for earliness. May have been intercrossed at times with Arrowhead.
220850 - Iran - Needs further evaluation. Somewhat late and somewhat tall but good uniformity.
245736 - Turkey - Tall, late, but has good bushel weight.
251991 - Turkey - Mixed seed color, tall, good bushel weight.
253418 - Spain - Needs further evaluation. Height and maturity o.k., good head size and stalk diameter.

- R. G. Robinson, Minnesota

(3) 263178 - Tanganyika - This introduction proved quite variable in height and maturity. A number of fairly short early flowering plants were self-pollinated. It proved quite variable in self-compatibility. Seed produced will be grown in S_1 progeny rows in 1961, although no outstanding characteristics were noted in 1960.

- M. Kinman, Texas

b. Helianthus macrophyllus x tuberosus (Sunchoke) 201814,201815,201816

The following report was received on the evaluation of 3 accessions of sunchoke in Minnesota. The data is combined for the species rather than individual accessions.

Characteristic	H. macrophyllus x tuberosus	Common H. tuberosus
Size	28" taller than common var.	
Stem	1/2" thicker	" " "
Yield, 1st Yr.(Lbs/hill)	18.2	13.7
No.tubers per hill	36.1	33.3
Refractometer tests for Sol. solids (1st Yr.)	9-10%	9-10%
Loss in storage over winter	92%	3.9%
Loss in field over winter	1 hill survived 1 perfect tuber did not germinate	78 hills-3 or less rotten tuber 8 hills-no rotten tubers 4 hills-destroyed
Refractometer tests for Sol. solids (2nd Yr. on stored tubers)	0-3%	8.1-8.5%
Germination (2nd Yr.)	0%	90%

The H. macrophyllus x tuberosus tuber type was very similar to a sweet potato, being quite long and much smoother than the common variety.

Conclusions:

1. While the cross is not sufficiently hardy to survive Minnesota winters on the basis of this single trial, it is an excellent variety of Jerusalem Artichoke or Girasol.
2. If stored, it should be stored in the ground and lifted at the time of usage or in the spring at planting time.
3. Condition of tubers when dug in the fall was far superior in appearance, size and usability than the common variety.
4. There exists a chance that progress can be made by crossing various varieties and lines of H. tuberosus to improve appearance and yield.
5. This work should be done with hardy northern strains.

- K. E. Relyea, Minnesota

5. ORNAMENTAL

a. Chrysanthemum sp.

Two recent Japanese accessions, PI 235624 and 235627 proved to be of interest at the North Platte Nebraska Experiment Station, University of Nebraska.

PI 235624 - Height 24-30 inches, stems stiff and strongly upright; foliage heavy, thick, dark green; flowers incurved, in dense clusters at the terminal of the branches, deep purple red, full double blooming from early September; a good female parent producing considerable seed.

PI 235627 - Almost completely sterile; only 4 seed from 30 flower heads.

- Glenn Viehmeyer, Nebraska

 APPENDIX D

NORTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION

Prepared for NC-7
Tech. Committee
Meeting at Ames, Iowa
September 15-16, 1960

I. Analytical Data on NC-7 Samples

Chemical results on samples grown under NC-7 auspices in 1959 season are provided in Table I (attached). No samples were received at the Northern Utilization Research and Development Division from the Indiana plantings.

In Table II are calculations we made on these selected species based on best yield at that particular location and on our analytical values. Soybean (and in one case, flax) yields are cited for comparison.

Comments:

(a) Highest seed yields obtained in NC-7 plantings are of crucifer species, of interest to the Northern Division because of high erucic acid contents in their seed oils. Utilization research on erucic acid is in progress at NU.

(b) Crambe abyssinica is of particular interest because of high erucic acid content of its oil. However, content of the sulfur compounds indicated in Table I will probably prove detrimental to feeding value of the meal. Is there a chance of samples lower in these constituents as a result of selection or breeding?

(c) Some variability is observed in Table I as regards effect of location on total oil or protein content. As indicated in one footnote, this may be caused in part by unfilled seeds in some samples. However, chemical composition of the oil (iodine value and erucic acid content) and meal (isothiocyanate and thiooxazolidone content) are little affected by location except in case of Kansas samples where very low yield may make samples atypical.

(d) Planting results seem quite promising, considering that this is in some cases first attempt at planting species as crops.

II. NU Progress in Oilseed Screening and Characterization.

The number of samples received and analyzed at NU is at a continuing good rate. Also, the rate of developing new leads on species which contain chemically new or unique constituents in substantial quantity is favorable. Novel oils are under study from seeds of the following genera: Lesquerella, Cuphea, Hibiscus, Penstemon, Ipomoea, Thalictrum and others. Crops Research Division is aware of our results and will make appropriate planting recommendations to NC-7 as the situation develops.

III. Seed Mucilages

Seeds from 175 species in 26 families were tested for their content of water-soluble mucilage. Twenty-one herbaceous species (all legumes) were found to contain more than 15 percent of water-soluble galactomannan gum.

Eighteen of these are previously unreported. Genera involved include Crotalaria, Cassia, Trigonella, Astragalus, Melilotus, and Trifolium. Preliminary testing indicates probable utility of these mucilages as paper additives.

IV. Pulp Fiber Crops

Screening of annual plants as papermaking raw materials is continuing, and selection of technologically preferable species is possible. These better samples include okra, kenaf, roselle, velvet weed, Sorghum almum, Crotalaria juncea, Crotalaria striata, Pennisetum typhoides, and Pennisetum spicatum. Other materials showing promise in the laboratory are Andropogon gerardi, Andropogon hallii, Stipa viridula, and a very few selected accessions of Sorghum vulgare.

Economic considerations are of prime importance in considering papermaking raw materials so it is necessary that tonnage of dry matter per acre be high, probably above 5 tons.

V. Samples received and processed at NU from initiation of program up to June 1.

Seed Samples

Received	2473
Analyzed	2219

Fiber Samples

Received	803
Analyzed	509
Pulped on lab. scale	77

Oil samples analyzed for fatty acids 277

Seed meal samples analyzed for amino acid content 170

Table I
NC-7 Samples, 1959
Analytical Report

Species	Source and Harvest	Seed Analysis, Dry Basis: Oil %	Protein: %	Protein, oil-free meal, %	Oil Iodine Value	Erucic Acid, % in Oil	Seed Meal Anal. Isothiocyanate mg./g.	Thiooxzolidon mg./g.
Brassica campestris	(Minn.-med.)	33.3	28.8	43.2	101.0			
" "	(Minn.-late)	32.9	30.0	44.7	101.6			
" "	(Minn.-early)	34.2	28.8	43.8	102.3			
Brassica sp.	(Minn.-med.)	25.0	31.2	41.6	116.2			
" "	(Minn.-early)	26.9	28.8	39.4	116.9			
" "	(Mo.-combined)	20.3	35.0	43.9	116.7			
" "	(Iowa-combined)	22.1	36.9	47.4	118.9			
" "	(Kan.-early)	13.2	38.8	44.7	112.5			
Crambe abyssinica	(Minn.-med.)	34.9	23.1	35.5	90.0	59	2.5	5.5
" "	(Minn.-late)	31.6	23.8	34.8	92.0	57	1.8	5.4
" "(17184-59-IC)	(Minn.-early)	35.9	21.9	34.2	89.4	58	1.8	4.9
" "(24427-59-IC)	(Minn.-early)	35.0	21.9	33.7	89.3	59	1.7	4.8
" "	(Mo.-combined)	27.7	28.8	39.8	90.2	56	2.3	5.4
" "	(Iowa-combined)	32.5	24.4	36.1	88.5	59	1.6	4.5
" "	(Kan.-early)					48	1.7	4.4
Euphorbia marginata*	(Minn.-med.)	11.8	16.2	18.4	180.3			
" " *	(Minn.-late)	9.6	15.6	17.2	175.0			
" " *	(Minn.-early)	15.5	16.2	19.2	181.6			
" " *	(Mo.-combined)	31.8	21.2	31.1	187.2			
" " *	(Iowa-combined)	15.6	16.2	19.2	181.4			
" " *	(Kan.-late)	28.2	19.4	27.0	183.5			
" " *	(Kan.-early)	18.9	16.2	20.0	187.8			
Euphorbia heterophylla	(Mo.-combined)	35.8	29.4	45.8	190.3			
" "	(Kan.-early)	34.5	25.0	38.2	192.4			
Raphanus sativus	(Minn.-med.)	36.4	33.8	53.1	97.8	33		
" "	(Minn.-late)	28.9	35.6	50.1	101.5	34		
" "	(Minn.-early)	38.7	31.2	50.9	95.2			
" "	(Mo.-combined)	31.7	38.1	55.8	94.8	33		
" "	(Iowa-combined)	33.4	38.8	58.2	95.6	31		
" "	(Kan.-early)	29.2	37.5	53.0	94.5	30		
Rudbeckia bicolor	(Minn.-early)	29.6	26.2	37.2	150.4			
" "	(Mo.-combined)	29.4	27.5	39.0	148.2			
" "	(Iowa-combined)	27.8	26.2	36.3	148.8			
Eruca sativa	(Minn.-med)	32.5	31.9	47.2	100.4	43	18.2	0
" "	(Minn.-late)	32.0	31.9	46.9	100.8	44	18.7	0
" "	(Minn.-early)	33.0	30.6	45.7	100.1	45	18.9	0
" "	(Mo.-med.)	30.4	36.2	52.0	100.0	42	18.6	0
" "	(Mo.-combined)	30.5	36.2	52.1	99.8	42	18.5	0
" "	(Iowa-combined)	32.9	36.2	53.9	102.2	44	19.9	0
" "	(Kansas-early)					43	11.1	0

* Samples contained mixture of different colored (probably some immature) seeds. Values reported are for brown seeds analyzed separately. Low values found in the Euphorbia marginata series may be explained by presence of poorly filled seeds.

APPENDIX D

Table II

Acreage Yields of Seed and Constituents from Three Crucifers

1=Crambe abyssinica. 2=Eruca sativa. 3=Raphanus sativa.

Location and Crop	Pounds Per Acre			
	Seed	Oil	Protein	Oil + Protein
	As-is basis	d.b.	d.b.	d.b.
Minnesota				
1	1413	463	307	770
2	709	210	204	414
3	1013	369	304	673
Soybeans (1957)	1290	232	464	696
Flax (All U.S. av. yield used)		187	118	305
Missouri				
1	713	186	193	379
2	505	145	172	317
3	363	108	130	238
Soybeans (1957)	1290	232	464	696
Iowa				
1	1081	330	248	578
2	322	100	110	210
3	217	68	79	147
Soybeans (1957)	1620	292	584	876
Texas				
1	range 700-1500 av. 1008	range 222-477 av. 320	range 164-352 av. 237	highest 829 av. 557
Soybeans (1957	1620	292	584	876

APPENDIX E

The best yield in pounds per acre reported by each of 5 states and the planting date (*) which produced these yields. 1959

Family	Genus and Species	Indiana	Iowa	Kansas	Missouri	Minnesota
Cruciferae	Brassica campestris	335 (1)	27	-	35 (2)	423 (1)
	Crambe abyssinica	434 (2)	1081	19 (2)	713 (2)	1413 (2)
	Eruca sativa	436 (1)	322	7 (1)	505 (1)	709 (1)
	Raphanus sativa	700 (1)	217	92 (1)	363 (1)	1013 (1)
	Lunaria Annua	-	-	-	-	-
	Matthiola Bicornis	284 (1)	150	-	115 (1)	18 (2)
	Brassica sp.	61 (2)	178	10 (2)	234 (2)	742 (2)
Umbelliferae	Daucus carota	401 (1)	-	41 (2)	363 (1)	266 (1)
	Foeniculum vulgare	-	24	177 (2)	911 (1)	9 (1)
	Pimpinella anisum	18 (1)	-	-	48 (2)	171 (1)
Scrophulanaceae	Antirrhinum majus	-	-	-	-	-
	Veronica spicata	-	-	-	-	-
Labiatae	Majorana hortensis	-	-	-	-	-
	Satureja hortensis	15 (2)	60	-	340 (1)	14 (1)
	Nepeta mussinii	-	-	-	-	-
Euphorbiaceae	Euphorbia marginata	260 (2)	814	431 (1)	563 (1)	365 (1)
	Euphorbia heterophylla	120 (2)	-	165 (2)	220 (2)	61 (1)
	Mercurialis Annua	-	-	-	-	70 (3)
Funariaceae	Argenome intermedia	-	-	-	-	2 (1)
Compositae	Rudbeckia bicolor	-	77	27 (2)	230 (2)	121 (1)
	Eupatorium rugosum	-	-	-	20 (2)	16 (1)
	Helenium autumnale	-	-	-	-	-
	Helianthus maximiliani	60 (2)	53	351 (1)	380 (2)	326 (2)

* Plant Dates

Indiana	(1) 4/14	(2) 5/19	(3) 6/5
Iowa	(1) 5/1	(2) 5/25	
Kansas	(1) 4/17	(2) 5/4	(3) 6/5
Missouri	(1) 4/23	(2) 5/2	
Minnesota	(1) 5/5	(2) 5/19	(3) 6/2

Yield by dates not reported. - Only two dates for a given species, 1st planting is 4/17 or 5/4.