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, 1968

1. PROJECT: NORTH CENTRAL REGIONAL PROJECT NC-7
NC-7 "New Plants" - The Introduction, Multiplication, Preservation and Evaluation of New Plants for Industrial and Agricultural Utilization.

2. COOPERATING AGENCIES AND PRINCIPAL LEADERS:

Administrative Adviser			E. F. Frolik, Nebraska
State Experiment Stations and Representatives			
Wisconsin	*W. H. Gabelman, Chm.	Minnesota	*L. C. Snyder
Alaska	*R. L. Taylor	Missouri	*A. D. Hibbard
Illinois	*E. B. Patterson	Nebraska	*J. H. Williams, Sec'y.
Indiana	*K. J. Lessman	North Dakota	*G. A. Peterson
Iowa		Ohio	*M. H. Niehaus
Kansas	*C. E. Wassom	South Dakota	*R. M. Peterson
Michigan	*C. M. Harrison		
U. S. Department of Agriculture			
New Crops Research Branch			*J. L. Creech, Chief
Cooperative State Research Service			C. I. Harris
Soil Conservation Service			*M. D. Atkins
Northern Utilization Research & Dev. Div.			*I. A. Wolff
U. S. Forest Service			*D. H. Dawson
North Central Regional Plant Introduction Station, Ames, Iowa			
Regional Coordinator			W. H. Skrdla
Horticulturist			A. F. Dodge
Plant Pathologist			R. L. Clark
Entomologist			J. L. Jarvis

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS:

a. Introductions Having Special Value.

(1) Alfalfa

(a) The Crops Research Division, ARS, U.S. Department of Agriculture, released an alfalfa population, AWPX3 for breeding purposes. It was developed for resistance to the alfalfa weevil and is an extremely broad-based population. Its parentage includes 13 plant introductions: PI's 202824 Arabia, 204461 Turkey, 223789 Afghanistan, 233197 USSR, 234482 Spain, 235539 Spain, 235821 Sweden, 236606 France, 253445 Yugoslavia, 258752 USSR, 258829 USSR, 262536 Israel and 263154 USSR.

(b) A genetic male sterile clone was isolated from PI 178980, Turkey at Northrup-King & Co. This clone was very vigorous but a poor seed setter. It produces very vigorous progeny and further evaluation is in progress.

(c) An S_2 single plant selection was made at the Teweles Seed Co., Wisconsin, from PI 206452 Turkey, Medicago sativa. It was tested in top cross combinations and found (1) to be a very good seed setter and (2) to transfer male sterility well, ie, 64 MS, 16 partial MS and 2 fertile offspring. Winter hardiness is excellent and yield is 106% of Flemish checks.

At the same location, a single S_1 plant of 258825 USSR, M. sativa, having the D-type or maintainer genotype with a cytoplasmic male sterile series was selected. It is an excellent general combiner -- yield in top cross is 125% of Flemish check at Richfield, Wisconsin. Exhibits adequate male sterile transfer, ie, 35 MS, 10 partial MS and 0 fertile offspring.

(2) Corn. Single dominant genes that condition resistance to Puccinia sorghi were identified at the Illinois station in corn inbred lines developed from the following introductions: 172597 Turkey, 251653 Yugoslavia and 193906 Ethiopia. The genes, including two previously identified but unplaced, were shown by recombination tests to be located at four loci.

(3) Birdsfoot Trefoil. Plant introductions of Lotus corniculatus were screened in field tests at the Missouri Station for resistance to root and crown rot. Two accessions, PI's 251146 and 251147 from Yugoslavia were much superior to the

better and prostrate.

standard commercial checks in persistence and resistance to root rot. It is hoped that these two accessions may be entered in the NC-83 cooperative program for seed multiplication and regional testing.

(4) Cucurbita. At the Kansas Station, after six years of screening Cucurbita plant introductions for resistance to squash bug and cucumber beetle, several promising introductions were found. A total of 387 Cucurbita sp. lines were tested and sources were found for both kinds of insect resistance which will reduce insecticidal control of both if incorporated into suitable horticultural varieties. This work is reported in North Central Regional publication 183 (see 6a (1) below).

(5) Cucumber

(a) Gynoecious cucumber lines and hybrids tracing sex expression to 'Shogoin', PI 220860 from Korea, continue to be utilized. Since 1960, 9 breeding lines and 5 varieties were released by the Michigan Agricultural Experiment Station. MSU713-5 was the first gynoecious pickling type cucumber derived from crosses with PI 220860 and this line is the source of female sex expression for hybrid cucumber development now going on throughout the world. Total hybrid seed with MSU713-5 parentage approximates 150,000 pounds sold for the 1968 crop of processing cucumbers.

(b) In March, 1968, the Michigan Station released the breeding line MSU 35G, a gynoecious pickling cucumber inbred line which is derived from a cross between MSU713-5 X SMR 15. It is tolerant to mosaic and scab and shows adaptation to mechanical harvesting.

(c) In April, 1968, the Michigan Station released the F_1 hybrid cucumber, 'Spartan Progress'. Its pedigree is MSU 35G X 381 M, thus tracing back to MSU713-5 and PI 220860.

(6) Tomato

(a) PI 79532, the wild tomato from Peru that contributed disease resistance to over 35 tomato varieties contributed germplasm to another variety, 'Pink Gourmet' released in 1968 by the Missouri Station. Its contribution was made through the breeding line USDA A-2116 (Mo. acc. 160). The variety carries resistance to Fusarium wilt, contributed by 79532.

(b) PI 79532 also contributed Fusarium wilt resistance to the variety 'Parker' released in 1968 by the USDA Crops Research Division.

(c) PI's 79532 and 126445, both from Peru contributed germplasm to the varieties 'Tropi-Gro' and 'Tropi-Red' released in Florida.

(d) PI 280597, a variety introduced from the Ukraine, USSR called 'Maliutka' was released by a private seed firm in Ontario, Canada, as 'Siberian'. It has the ability to set fruit under cool conditions and to germinate in cool soils.

(7) Crambe. The Crambe variety, 'Prophet' was released by the Indiana Station in 1968. It is derived from PI 247310, from Sweden which was also used as the source of most of the large scale Crambe plantings in the U.S. In 1968, 175 acres were grown in Indiana where it shows much promise. Approximately 1,000 lines derived from individual plant selections and 6 synthetics are being evaluated. Work on 'Prophet-2' is underway. At the North Central Regional Plant Introduction Station, the entomologist found that PI 247310 had more turnip aphid resistance than any other Crambe introductions tested.

b. Accomplishments at the Regional Station.

New agronomic, horticultural and industrial plant introductions received in 1968 totaled 570. For seed increase and revitalization, about 2500 accessions were grown. The number of packets of seed distributed was 11,150 and for ornamental plants, 785 items. Over 15,000 separate introductions are on the active inventory and of these, nearly 13,500 are available for distribution.

Introductions evaluated for disease resistance include 310 corn, 180 tomato and 400 alfalfa. In corn, 10 introductions (204850, 213759, 195237, 200179, 213695, 213702, 163597, 198896, 213713, 209135) showed good resistance to Diplodia stalk rot compared with the check varieties; 6 introductions (194047, 194387, 197261, 198896, 198899, 198905) showed best resistance to rust; 4 introductions (196128, 196129, 196130, 213701) showed best resistance to northern leaf blight; 4 introductions (198904, 198905, 200286, 204803) had no smut showing on any of the 40 plants. In tomato, 15 introductions showed excellent resistance to Rhizoctonia soil rot of the fruits. They are all Lycopersicon peruvianum. PI 128639, a suspected L. esculentum x L. pimpinellifolium cross, scored 1.88. The variety 'Brookston' scored 3.33

In alfalfa, 10 out of 400 introductions showed promise for resistance to Leptosphaerulina (Pseudoplea) reaction (229955, 230225, 230607, 233713, 234673, 234787, 234816, 235093, 255884, 258752). Retests will be made. In sand benches, 533 accessions were tested for resistance to the northern root knot nematode, Meloidogyne hapla. Twenty accessions showed evidence of some resistance in each of 2 separate tests.

Crambe introductions were screened for resistance to aphids. PI 247310 was resistant to the ~~green peach~~ turnip aphid. Brassica species were evaluated for resistance to turnip aphids. Resistance was noted in B. nigra, B. juncea and 1 accession of B. napus (PI 171538). No resistance was found in B. hirta and only 1 plant in B. campestris (from PI 173868) was resistant. No resistance to green peach aphid was found in spinach. About 100 pepper introductions were screened in the field and greenhouse for resistance to the European corn borer. Two accessions of Capsicum annuum (105338 and 288934) showed some resistance. All other species and accessions were susceptible.

In the regional ornamental evaluation program, 674 plants were sent out to trial sites. Of these, 382 were donated by Nurserymen and 292 were grown at Ames. Included were a fine leaved Medicago falcata for possible ornamental use and two Yuccas collected by Viehmeyer in the Southwest. At the regional station, 33 Lonicera coerulea plants continue to survive local drought, soil and temperature conditions. Seedlings of Bald Cypress and Sweetgum native to the Mississippi-Ohio River delta were planted at Ames in 1967. None of the Sweetgum survived the first winter but 23% of the Bald Cypress did, though with some injury to the wood. Chamaebatiaria millefolium continues to show promise as aground cover, as winter hardiness appears to be no problem.

c. Regional Cooperative Program

The Ohio Station assisted in the increase and evaluation of 150 new tomato introductions. The Nebraska Station continued to evaluate alfalfa introductions; the Missouri Station is evaluating trefoil introductions for root rot resistance; the Indiana Station is evaluating grass and legume introductions.

4. USEFULNESS OF FINDINGS:

Plant introductions continue to provide valuable germplasm for plant characters, disease and insect resistance and other traits that are useful to plant breeders for developing and improving crop varieties, which benefits the general public. The evaluation of introductions and dissemination of information and seed helps to better serve crops workers. The permanent maintenance of plant introductions assures a valuable germplasm pool for present and future use.

5. WORK PLANNED FOR NEXT YEAR:

a. Continue program of seed increase, storage, preliminary evaluation, pathology and entomology screening work, local and regional testing of new crops and ornamentals and coordination of cooperative program.

b. Assist the South Dakota Station with collecting native grasses.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR: Publications that concern information on plant introductions are listed below. Additional ones are listed in Appendix A.

a. Regional Publications.

(1) Kansas

Hall, C. V. and R. H. Painter. Insect Resistance in Cucurbita. North Central Regional Research Publication 183; Kansas Agricultural Experiment Station Tech. Bul. 156, 27 pages, February, 1968.

(2) Ohio

Skrdla[1], Willis H., Leonard J. Alexander, Gene Oakes, and Albert F. Dodge[1]. Horticultural Characters and Reaction to Two Diseases of the World Collection of the Genus Lycopersicon. North Central Regional Research Publication 172; Ohio Agricultural Research and Development Center Res. Bul. 1009, 110 pages, April 1968.

[1] Regional Plant Introduction Station.

b. State Station Publications.

(1) Indiana

Christmas, E. P., K. J. Lessman, C. B. Southard, and M. W. Phillips. Crambe, A Potential New Crop for Indiana. Cooperative Extension Service Publication AY-168, 11 pages.

(2) Michigan

(a) Honma, S., H. H. Murakishi, and S. H. Wittwer. Moto-Red--A Tobacco Mosaic Virus Resistant Greenhouse Tomato. Quar. Bul. Michigan Agr. Exp. Sta. 50: 285-287. February, 1968.

(b) Markarian, Deran and Fred C. Elliott. 1968. A Bioassay of Inbred Pea Lines for Differences in Nutritional Value. Quar. Bul., Michigan Agr. Exp. Sta. 50:293-295. February.

(3) Minnesota

Radcliffe, E. B. and F. G. Holdaway. Sweetclover Resistance to Weevil Attack. Minnesota Farm & Home Science 22:5-7. Fall 1964.

(4) Missouri

Lambeth, V. N. Release of Hybrid Tomato--Pink Gourmet. Univ. of Missouri AES Special Report 93, 3 pages, March, 1968.

c. USDA Publication

Stoner, Allen K. and A. G. Gentile. October 1968. Resistance of Lycopersicon Species to the Carmine Spider Mite. U.S. Dept. of Agriculture Research Service Production Research Report No. 102, 9 pages.

d. Journal Articles

(1) Iowa

(a) Clark[1], R. L. 1968. Epidemiology of Tomato Curly Top in the Yakima Valley. Phytopathology 58:811-813.

(b) _____. 1968. Restricted Local Spread of Curly Top in Tomatoes. Pl. Dis. Rep. 52:17-18.

(c) Jarvis[1], J. L. 1968. Resistance in Pepper Introductions to the Green Peach Aphid. Proc. North Central Branch Entomol. Soc. Amer. 23:53 (Abstract).

(d) Sriwatanapongse, Sutat, and C. P. Wilsie. 1968. Intra-and Inter-variety Crosses of Medicago sativa L. and Medicago falcata L. Crop Sci. 8: 465-466.

(2) Illinois

Wilkinson, D. R. and A. L. Hooker. 1968. Genetics of Reaction to Puccinia sorghi in Ten Corn Inbred Lines from Africa and Europe. Phytopathology 58: 605-608.

(3) Minnesota

(a) Hedlin, L. K. and E. B. Radcliffe. 1966. Resistance of Sweetclover to the Sweetclover Weevil. Proc. North Central Branch Entomol. Soc. 21:128-132.

(b) Radcliffe, E. B. and F. G. Holdaway. 1965. Resistance in Melilotus to Sitona cylindricollis Fahraeus. Proc. XII Int. Congr. Ent., London, 1964, page 535.

(4) Missouri

Sehgal, O. P. and Jong-Ho Jean. 1968. Additional Hosts of Maize Dwarf Mosaic Virus. Phytopathology 58:1321-1322.

(5) Nebraska

(a) Burnside, O. C. and J. H. Williams. 1968. Weed Control Methods for Kinkaoil, Kenaf, and Sunn Crotalaria. Agron. J. 60:162-164.

(b) Newell, L. C. 1968. Registration of Blaze Little Bluestem. Crop Sci. 8:515.

(c) _____. 1968. Registration of Champ Bluestem. Crop Sci. 8:515.

(d) _____. 1968. Registration of Pawnee Big Bluestem. Crop Sci. 8:514-515.

(e) _____. 1968. Registration of Pathfinder Switchgrass. Crop Sci. 8:516.

[1] Regional Plant Introduction Station

(6) Wisconsin

Hagedorn, D. J. 1968. Disease Reaction of Pisum sativum Plant Introductions to Three Legume Viruses. Pl. Dis. Rep. 52:160-162.

(7) USDA

(a) Dropkin, V. R., D. W. Davis and R. E. Webb. 1967. Resistance of Tomato to Meloidogyne incognita acrita and to M. hapla (Root knot nematodes) as determined by a new technique. ASHS 90:316-323.

(b) Gentile, A. G. and A. K. Stoner. 1968. Resistance in Lycopersicon and Solanum Species to the Potato Aphid. J. Econ. Entomol. 61:1152-1154.

(c) _____, _____. 1968. Resistance in Lycopersicon spp. to the Tobacco Flea Beetle. J. Econ. Entomol. 61:1347-1349.

(d) _____, R. E. Webb, and A. K. Stoner. 1968. Resistance to Lycopersicon and Solanum to Greenhouse Whiteflies. J. Econ. Entomol. 61:1355-1357.

(e) Leppik, E. E. 1968. Relative Resistance of Cucumis Introductions to Diseases and Insects. Advancing Frontiers of Plant Sciences 19:43-50, 5 plates.

7. APPROVED:

January 23, 1969
Date

W. H. Gabelman

Chairman, Technical Committee
W. H. Gabelman

January 23, 1969
Date

E. F. Frolik

Regional Administrative Adviser
E. F. Frolik

MISCELLANEOUS PUBLICATIONS

1. Publications in Manuscript.

a. Clark, R. L.[1] Resistance to Northern Rootknot Nematode (Meloidogyne hapla Chitwood) in Plant Introductions of Daucus carota.

b. Dodge, A. F.[1] North Central Regional Plantings of the Christine Buisman Elm.

c. Jarvis, J. L.[1] Differential Reaction of Introductions of Crambe to the Turnip Aphid and the Green Peach Aphid.

2. Mimeograph or Offset Publication.

Clark, R. L.[1], J. L. Jarvis[1], S. W. Braverman, S. M. Dietz, G. Sowell, Jr., and H. F. Winters. A Summary of Reports on the Resistance of Plant Introductions to Diseases, Nematodes, Insects and Mites.--Lycopersicon spp. Mimeograph publication from the North Central Regional Plant Introduction Station, 62 pages. 1968.

3. Printed Publications. The publications listed below are primarily from other regions but concern NC-7 primary maintenance crops.

a. Tomatoes

(1) Hassan, A. A., D. L. Strider and T. R. Konsler. 1968. Application of Cotyledonary Symptoms in Screening for Resistance to Tomato Bacterial Canker and in Host Range Studies. Phytopathology 58:233-239.

(2) Strobel, J. W., J. M. Walter and N. C. Hayslip. 1967. Tropi-Red--A Determinate Tomato with Excellent Color and Multiple Disease Resistances. Florida Agricultural Experiment Station Circular S-182, 16 pages, October 1967.

(3) Strobel, J. W. 1967. Tropi-Gro--A Determinate Tomato with a New Combination of Disease Resistances. Florida Agricultural Experiment Station Circular S-183, 15 pages, October, 1967.

(4) Thyr, B.D. 1968. Resistance to Bacterial Canker in Tomato, and its Evaluation. Phytopathology 58:279-281.

4. Popular-Type Article.

Bries, Dennis. Plant Hunting--Behind the Iron Curtain. Iowa Agriculturist 68:14. Winter 1968.

[1]Regional Plant Introduction Station.

Inventory and Summary of Accessions Maintained and Received through 1968.

Genera	Total Active Jan. 1 1968	Removed from Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Seed List 1969	**To Be Increased	Packets Distributed
GRASSES & FIELD CROPS							
Aegilops	162	0	1	163	155	8	95
Agropyron	167	0	14	181	162	19	26
Agrostis	131	1	3	133	110	23	13
Alopecurus	38	0	6	44	31	13	0
Apera	6	0	0	6	5	1	0
Apluda	1	1	0	0	0	0	1
Arrhenatherum	14	0	0	14	12	2	3
Avena	0	0	1	1	0	1	1
Boissiera	0	0	1	1	1	0	0
Brachypodium	0	0	6	6	0	6	0
Brachiaria	1	1	0	0	0	0	1
Bromus	532	39	39	532	466	66	113
Calamagrostis	11	0	7	18	9	9	0
Cynosurus	8	0	0	8	8	0	0
Dactylis	392	0	23	415	375	40	23
Danthonia	3	2	0	1	0	1	0
Echinochloa	25	2	1	24	20	4	21
Elymus	10	10	0	0	0	0	10
Eremopoa	3	0	0	3	2	1	0
Eremopyrum	12	0	0	12	12	0	3
Eriachne	1	0	0	1	0	1	0
Eriochloa	2	2	0	0	0	0	2
Euchlaena	9	0	11	20	7	13	11
Festuca	190	0	12	202	189	13	18
Gaudiniopsis	1	0	0	1	1	0	1
Glyceria	4	0	0	4	0	4	1
Helictotrichon	6	0	0	6	5	1	5
Heteranthelium	5	0	0	5	3	2	0
Hordeum	7	0	0	7	7	0	6
Koeleria	9	0	0	9	6	3	2
Lasiagrostis (Stipa)	0	0	1	1	0	1	0
Lolium	129	0	0	129	121	8	49
Milium	0	0	2	2	0	2	0
Nardus	2	0	2	4	2	2	1
Panicum	232	9	11	234	193	41	227
Pennisetum	3	3	0	0	0	0	3
Phacelurus	1	1	0	0	0	0	1
Phalaris	75	1	2	76	75	1	34
Phleum	48	0	0	48	46	2	3
Poa	49	0	2	51	50	1	8
Polypogon	14	1	0	13	12	1	0
Puccinellia	3	0	0	3	0	3	0
Schedonnardus	1	0	0	1	1	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.

Genera	Total Active Jan. 1 1968	Removed from Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Seed List 1969	**To Be Increased	Packets Distributed
Secale	5	0	0	5	5	0	7
Setaria	174	30	8	152	137	15	22
Sorghum	31	0	0	31	29	2	4
Stipa	1	0	0	1	0	1	0
Tricholaena	2	0	0	2	2	0	6
Tridens	2	0	0	2	2	0	2
Tripsacum	1	0	1	2	1	1	3
Trisetum	4	4	0	0	0	0	0
Triticum	1	0	0	1	0	1	3
Zea mays--Introd.	1818	6	36	1848	1786	62	1631
St. O.P. Coll.	259	0	0	259	230	29	----
TOTAL ZEA MAYS	2077	6	0	2107	2016	91	1631
TOTALS:Genera-53	4605	113	190	4682	4278	404	2360
LEGUMES							
Astragalus	57	2	7	62	39	23	3
Coronilla	28	1	18	45	22	23	70
Dalea	11	2	0	9	2	7	2
Dorycnium	1	0	0	1	1	0	1
Galega	5	0	7	12	1	11	1
Glycyrrhiza	0	0	1	1	0	1	0
Lathyrus	275	5	12	282	159	123	215
Lespedeza	31	0	0	31	26	5	5
Lotus	160	0	16	176	159	17	13
Lupinus	0	0	0	0	0	0	5
Madia	1	0	0	1	0	1	0
Medicago	780	32	46	794	761	33	1211
Melilotus	290	5	13	298	215	83	34
Onobrychis	68	1	12	79	55	24	3
Ononis	7	1	0	6	5	1	1
Psoralea	26	7	2	21	15	6	16
Scorpiurus	43	0	1	44	26	18	0
Stylosanthes	1	1	0	0	0	0	1
Tetragonolobus	19	0	0	19	13	6	17
Trifolium	452	0	10	462	458	4	2
Trigonella	167	21	4	150	132	18	49
Vicia	1	1	0	0	0	0	1
TOTALS:Genera-22	2423	79	149	2493	2089	404	1650

Genera	Total Active Jan. 1 1968	Removed From Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Seed List 1969	**To Be Increased	Packets Distributed
FRUITS & VEGETABLES							
Allium	201	1	0	200	180	20	1
Apium	60	3	1	58	56	2	0
Asparagus	53	0	1	54	26	28	2
Beta	299	1	1	299	298	1	346
Capsicum	0	0	0	0	0	0	1
Carica	3	0	0	3	0	3	0
Citrullus	6	4	0	2	0	2	4
Cucumis	523	21	9	511	463	48	977
Cucurbita	472	21	1	452	406	46	120
Daucus	315	1	33	347	231	116	18
Fragaria	2	0	0	2	0	2	0
Lactuca	255	255	0	0	0	0	378
Lycopersicon	3043	0	89	3132	3002	130	4541
Orlaya	1	0	0	1	0	1	0
Petroselinum	138	45	0	93	31	62	87
Phaseolus	36	36	0	0	0	0	1
Pisum	1284	2	0	1282	1260	22	219
Prunus	1	0	0	1	0	1	0
Pyrus	2	0	0	2	0	2	0
Rheum	7	0	0	7	4	3	0
Rubus	84	0	0	84	84	0	0
Solanum	1	0	0	1	0	1	30
Spinacia	190	1	0	189	185	4	1
Vaccinium	4	0	0	4	0	4	0
TOTALS:Genera-24	6980	391	135	6724	6226	498	6726
OIL & SPECIAL							
Adonis	1	0	0	1	0	1	0
Alyssum	1	0	0	1	1	0	0
Amaranthus	0	5	5	0	0	0	5
Ammi	0	0	1	1	0	1	0
Anethum	70	0	1	71	16	55	16
Arctium	1	0	0	1	1	0	1
Bandeiraea	0	0	0	0	0	0	1
Berteroa	0	0	2	2	0	2	0
Biscutella	1	0	0	1	0	1	0
Brassica	444	2	45	487	397	90	54
Briza	3	0	1	4	0	4	2
Bupleurum	1	0	0	1	0	1	0
Calamintha	0	0	1	1	0	1	1
Calendula	3	0	0	3	2	1	2
Caltha	1	0	0	1	0	1	0
Camelina	8	0	0	8	7	1	4
Cardamine	1	0	0	1	0	1	0
Cassia	6	0	0	6	1	5	0
Chamaepeuce	1	0	0	1	0	1	0
Chenopodium	3	0	0	3	0	3	0
Christolea	0	0	1	1	0	1	1
Chrysanthemum	0	0	1	1	0	1	0
Cichorium	2	0	0	2	2	0	0
Cnicus	1	0	0	1	1	0	0

Genera	Total Active Jan. 1 1968	Removed From Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Seed List 1969	**To Be Increased	Packets Distributed
Coleus	12	0	0	12	12	0	0
Crambe	30	0	9	39	24	15	85
Crepis	1	0	0	1	0	1	0
Crotalaria	1	0	0	1	0	1	0
Cyamopsis	5	0	0	5	0	5	0
Cynara	2	0	0	2	0	2	0
Dimorphotheca	1	0	0	1	0	1	0
Ducrosia	1	0	0	1	0	1	0
Echinacea	1	0	0	1	0	1	0
Echium	0	0	2	2	0	2	2
Eruca	32	0	0	32	32	0	1
Eryngium	0	0	1	1	0	1	0
Euphorbia	8	0	3	11	6	5	8
Foeniculum	2	0	1	3	2	1	0
Glaucium	1	0	0	1	1	0	1
Guizotia	1	0	0	1	0	1	0
Helenium	1	0	0	1	0	1	0
Helianthus annuus	295	6	0	289	271	18	197
Helianthus spp.	7	0	3	10	2	8	0
Heracleum	0	0	2	2	0	2	0
Hibiscus (Kenaf)	1	0	0	1	1	0	1
Iberis	2	0	0	2	0	2	0
Impatiens	1	0	1	2	0	2	0
Lallemantia	3	1	0	2	1	1	0
Lappula	1	0	1	2	0	2	1
Lapsana	1	0	1	2	0	2	0
Lepidium	1	0	0	1	1	0	0
Limnanthes	17	0	0	17	17	0	10
Leonotis	1	0	0	1	0	1	0
Lobularia	1	0	0	1	0	1	0
Lunaria	1	0	0	1	0	1	0
Mentha	11	0	0	11	7	4	3
Monarda	0	0	4	4	0	4	2
Mosla	0	0	1	1	0	1	1
Oenothera	0	0	1	1	0	1	1
Onosma	0	0	1	1	0	1	0
Osteospermum	1	0	0	1	0	1	0
Perilla	10	1	0	9	9	0	2
Petroselinum	0	0	1	1	0	1	0
Picris	2	0	1	3	0	3	0
Raphanus	8	0	0	8	8	0	0
Rhaponticum	0	0	1	1	0	1	0
Ricinus	10	0	0	10	0	10	0
Robinia	1	0	0	1	1	0	0
Rochelia	0	0	1	1	0	1	1
Rosa	1	0	0	1	1	0	0
Rudbeckia	1	0	0	1	1	0	1
Salvia	1	0	0	1	1	0	1
Satureja	6	0	0	6	3	3	5
Schlechtendalia	2	0	0	2	0	2	0

Genera	Total Active Jan. 1 1968	Removed From Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Seed List 1969	**To Be Increased	Packets Distributed
Sesamum	5	0	0	5	0	5	0
Sideritis	1	0	1	2	1	1	1
Sigesbeckia	1	0	0	1	0	1	0
Sinapis	2	0	0	2	0	2	0
Sisymbrium	1	0	0	1	0	1	0
Solanum	14	14	0	0	0	0	0
Spergula	2	2	0	0	0	0	1
Stenachaenium	1	0	0	1	0	1	0
Symphytum	1	0	0	1	1	0	0
Tephrosia	2	0	0	2	0	2	0
Thalictrum	2	0	0	2	1	1	0
Thlaspi	1	0	0	1	1	0	0
Trachyspermum	1	0	0	1	0	1	0
Vaccaria	1	0	0	1	1	0	1
Vernonia	3	0	0	3	3	0	4
TOTALS:Genera-89	1071	31	94	1134	837	297	417

Genera	Total Active Jan. 1 1968	Removed from Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Use In Pro-gram	Plants Distributed 1968
ORNAMENTALS						
PI Abelia	1	0	0	1	G	0
Abeliophyllum	1	0	0	1	G	0
PI Abies	1	0	1	2	G	0
Acanthopanax	1	0	0	1	G	0
PI Acer	5	1	1	5	G	0
PI Aconitum	0	0	1	1	G	0
PI Actinidia	0	0	1	1	G	0
PI Agapanthus	0	0	1	1	G	0
PI Alnus	5	0	0	5	G	0
PI Amelanchier	5	0	0	5	G	0
Amorpha	4	1	0	3	H	0
PI Ardisia	1	0	0	1	G	0
PI Armeria	1	0	0	1	G	0
PI Aronia	1	0	0	1	G	0
PI Begonia	4	0	0	4	G	0
PI Belancanda	1	0	0	1	G	0
Berberis	1	0	0	1	G	0
PI Betula	8	4	1	5	G	0
PI Buddlea	1	0	0	1	G	0
PI Buxus	23	1	0	22	G	0
PI Camellia	1	0	0	1	G	0
PI Caragana	2	0	0	2	G	0
PI Carpinus	1	0	0	1	G	0
Caryopteris	1	0	0	1	G	0
Castanea	1	0	0	1	DG	104
PI Cephalaria	1	0	0	1	H	0
PI Cercocarpus	2	0	0	2	G	0
PI Chamaebatiaria	4	0	0	4	G	0
PI Chrysanthemum	6	1	0	5	G	0
PI Clematis	1	0	1	2	G	0
PI Coleus	24	2	0	22	DG	44
PI Colutea	1	0	0	1	G	0
PI Cornus	5	1	5	9	G	0
Corylus	2	0	0	2	G	0
PI Cotoneaster	8	0	5	13	G	0
PI Cowania	0	0	1	1	G	0
Crataegus	6	1	3	8	G	0
Cytisus	1	0	0	1	G	0
PI Damnacanthus	1	0	0	1	G	0
PI Dasylirion	1	0	0	1	G	0
Deutzia	1	0	1	2	G	0
PI Dianthus	3	1	6	8	G	0
PI Dierama	1	0	0	1	G	0
Dirca	1	0	0	1	G	0
PI Duchesnea	2	0	0	2	G	0
Elaeagnus	2	0	0	2	G	0
Elsholtzia	1	0	0	1	G	0
Eucommia	1	0	0	1	G	0
Euonymus	6	0	6	12	G	0
PI Euphorbia	1	0	0	1	G	0

Genera	Total Active Jan. 1 1968	Removed from Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Use In Pro-gram	Plants Distributed 1968
PI Foresteria	1	0	0	1	G	0
Forsythia	1	0	1	2	G	0
Fothergilla	1	0	0	1	G	0
PI Fraxinus	2	0	1	3	G	0
PI Gaultheria	0	0	1	1	G	0
PI Genista	0	0	2	2	G	0
PI Geranium	0	1	1	0	G	0
Gleditsia	1	0	0	1	G	0
Haemanthus	1	0	0	1	G	0
PI Hedera	2	0	0	2	G	0
Helianthella	0	0	1	1	G	0
PI Hemiptelea	0	0	1	1	G	0
Hippophae	1	0	1	2	G	0
Hydrangea	3	1	0	2	G	2
Hypericum	7	0	1	8	G	0
PI Ilex	29	0	0	29	G	0
Indigofera	1	0	0	1	H	0
Iris	3	0	1	4	G	0
Jamesia	1	0	0	1	G	0
PI Juglans	1	0	0	1	G	0
PI Juniperus	0	0	4	4	6	0
PI Kohleria	1	0	0	1	G	0
PI Lavatera	0	0	1	1	G	0
Ledum	1	0	0	1	G	0
PI Ligustrum	4	0	4	8	G	0
PI Lippia	1	0	0	1	G	0
Liriope	1	0	0	1	G	0
Lonicera	5	0	1	6	DG	99
PI Lycium	1	0	0	1	H	0
Lythrum	1	0	0	1	G	0
PI Maackia	1	0	1	2	G	0
Malus	5	0	3	8	DG	200
PI Medicago	1	0	0	1	D	51
Metasequoia	1	0	0	1	G	0
PI Mimulus	1	0	0	1	G	0
PI Morus	1	0	0	1	G	0
Pachistima	1	0	0	1	G	0
PI Passiflora	1	0	0	1	G	0
Penstemon	10	0	0	10	H	0
PI Perephyllum	1	0	0	1	G	0
PI Philadelphus	5	0	0	5	G	0
Photinia	1	0	0	1	G	0
Physocarpus	1	0	0	1	G	2
Pinus	7	0	0	7	G	0
PI Polygonum	1	0	0	1	G	0
Potentilla	6	0	0	6	G	0
Prunus	1	0	2	3	G	0
PI Ptelea	1	0	0	1	G	0
PI Pyracantha	1	0	0	1	G	0
Pyrus	2	0	0	2	H	0
Quercus	2	1	0	1	G	0
PI Rhamnus	1	0	2	3	G	0

Genera	Total Active Jan. 1 1968	Removed from Inventory 1968*	Rec'd. 1968	Total Active Dec. 31 1968	Use In Program	Plants Distributed 1968
PI Rhododendron	6	1	10	15	G	0
PI Rhus	2	0	0	2	G	0
PI Robinia	1	0	0	1	H	0
Rosa	10	0	4	14	G	0
Rubus	2	0	0	2	H	0
Rudbeckia	1	0	0	1	G	0
Salix	1	0	0	1	G	0
PI Salmea	1	0	0	1	G	0
PI Salvia	1	0	0	1	G	0
PI Sambucus	1	0	5	6	G	0
PI Sanguisorba	0	0	1	1	G	0
PI Scabiosa	2	0	0	2	G	0
Securinega	1	0	1	2	G	0
PI Sedum	1	0	0	1	G	0
Sheperdia	2	1	1	2	H	0
Sophora	1	0	1	2	H	0
Sorbus	1	0	3	4	G	0
Spiraea	4	0	0	4	G	0
Stachyurus	1	0	0	1	G	0
Strobilanthes	1	0	0	1	G	0
PI Styrax	0	0	1	1	G	0
Symplocos	1	0	0	1	G	0
Syringa	8	0	0	8	DG	83
Taxodium	1	0	0	1	G	0
Thuja	2	1	0	1	G	0
PI Ulmus	9	0	30	39	DG	67
Vaccinium	3	0	0	3	H	0
PI Viburnum	6	0	1	7	G	0
PI Viola	0	0	1	1	G	0
Weigela	2	0	0	2	DG	0
PI Yucca	2	0	0	2	DG	137
TOTALS:Genera-133	349	19	122	451		785

MISCELLANEOUS INFORMATION NOT INCLUDED IN MAIN BODY OF 1968 NC-7 ANNUAL REPORT

1. Regional Station Production Program

The 1968 growing season is the twenty-first since the establishment of the Regional Station at Ames on December 1, 1947. In general, the growing season was one of the warmest in recent years. Rainfall was variable.

The 1968 seed increases resulted in the availability of about 520 additional accessions for the seed list (See Table II).

We made seed transfers to other regions in order to remove from our inventory items for which we do not have any priority maintenance. They are:

23	Bromus willdenowii	to W-6
10	Elymus	to W-6
28	Medicago (annuals)	to S-9
255	Lactuca spp.	to W-6
36	Phaseolus	to W-6
14	Solanum (tropical)	to S-9
366		

Table I. Number of Genera and Accessions of Various Crops Grown at the Regional Station in 1968.

Crop	No. of Genera 1967	No. of Genera 1968	No. of Accessions 1967	No. of Accessions 1968
Grasses	20	26	383	425
Legumes	13	12	239	429
Vegetables	9	9	820	830
Ornamentals	111	133	137	451
Special Crops	44	61	255	296
TOTAL	197	241	1834	2431
Carryover of perennial accessions			250	500
Total For Season			2084	2931

Special Purpose Plantings

Corn borer resistance evaluations (corn)	300 acc.	
Corn borer resistance evaluations (peppers)	100 acc.	
Cucumber beetle resistance evaluations	100 acc.	
Corn disease resistance evaluations	310 acc.	1240 plots
Tomato disease resistance evaluations	180 acc.	720 plots
	990 acc.	1960 plots

2. Total Seed and Plant Inventory for 1968

An inventory of accessions on hand in 1968 appears in Appendix B. A summary of that inventory appears in Table II below.

Table II. Summary of Appendix B

Crop	Total Active 1/1/68 Genera	Total Active 1/1/68 Accessions	Removed from Inventory '68	Rec'd 1968	Total Active 12/31/68	Seed List 1969	To Be Increased	Pkts. Plants Distributed
Grasses	56	4605	113	190	4682	4278	404	2360
Legumes	27	2423	79	149	2493	2089	404	1650
Vegetables	24	6980	391	135	6724	6226	498	6726
Oil & Special	86	1071	31	94	1134	837	297	417
TOTALS	193	15,079	614	568	15,033	13,430	1603	11,153
Ornamentals	133	349	19	122	451	-	-	785
TOTALS	326	15,428	633	690	15,484	13,430	1603	11,938

3. Seed Transfers to the National Seed Storage Laboratory
None was sent in 1968.

4. Ornamental, Plant Pathology and Entomology Programs. Accomplishments of the Plant Pathology and Entomology programs are described in Supplements I and II of this annual report, respectively. The ornamental program is discussed below.

a. Ornamental Evaluation Program

(1) Trial Plant Distribution

Cooperators planted a fine leaved Medicago falcata, two of Viehmeyer's, University of Nebraska, Yucca introductions, Chinese chestnut seedlings, Lonicera 'Bouquet', Malus 'Dainty', Malus 'Pygmy' and Syringa amurensis japonica.

Total number of trial plants sent out in 1968 from the Regional Station was 674. These included 382 donated by nurserymen and 292 plants grown at Ames. In addition 4 European elm selections totalling 67 plants and 21 Coleus selections were distributed during the year; or 783 plants total.

(2) Trial Plant Reports

Cooperators were concerned with performance reports for plants set out in 1964, 1965, 1966, 1967, 1968. A 10-year, or final report, for plantings made in 1959 was also called for during the year.

(3) New Accessions on Trial at the Regional Station

Thirty-three seedlings of PI 276114, Lonicera caerulea continue to survive local drought, soil and temperature conditions. Cuttings have been rooted and plants are being grown for further trial.

Seedlings of two trees of ornamental value native to Mississippi-Ohio River delta land were lined out in 1967 for growing on to trial plant size. Observations made during April, 1968, showed considerable dormant season injury.

The first winter mortality of seedlings of two tree species grown from seed collected in Southern Illinois.

Species	Total Number of Seedlings	Seedlings Killed	Mortality Percent	Age	Aver. Ht.
Bald Cypress	275	64	23	3-1	30"
Sweet Gum	367	367	100	2-1	24"

An examination of the remaining bald cypress plants was made to determine the extent of injury to the stem of these plants as measured from the tip.

Leader Injury Among Surviving Bald Cypress Plants

Extent of Leader Injury cm	Number of Plants	Percent of Live Plants
<1	18	8.5
1-5	30	14.2
5-10	53	25.1
10-15	39	18.5
15-30	37	17.5
30-60	30	14.2
>60	4	1.9
	211	99.9

A total of 101 plants was found to have sustained less than 10 cms injury to the stem. These and the remaining 110 plants were tagged and marked to show the total injury sustained during the 1967-68 dormant period. It is planned to remeasure these plants in the spring of 1969 prior to shipping the least injured plants to trial cooperators.

Introductions from the Viehmeyer - University of Nebraska collection being grown at the Regional Station include:

Amelanchier alnifolia introductions PI 303168, 303169, 303170, 303171 amounting to 150 plants have failed to show tolerance to leaf diseases.

This has been the case for most seedlings of PI 303225 Cercocarpus montanus. Cercocarpus ledifolius PI 323666 with 19 plants may have considerable resistance to leaf diseases.

Chamaebatiaria millifolium PI 323673, 323674, 323675, continues to show promise, since apparently winter hardiness is no problem.

Philadelphus microphyllus PI 323858 will bear watching (following the 1968-69 winter season) for cold injury.

Ptelia trifoliata	PI 323874	Some plants injured
Rhus trilobata	PI 303555	Satisfactory
Rosa sp.	PI 323895, 323896	Leaf rust susceptible
Crataegus sp.	PI 303264	Although quite vigorous was very susceptible to Gymnosporangium sp. rust which malformed twigs and leaves. These 12 plants were dug and destroyed April 12, 1968.

5. Domestic Exploration

Financial assistance to the Alaska Station from the New Crops Research Branch, though NC-7, terminated on June 30, 1968 because the term of the project expired on that date.

In 1967-68, 190 collections were made of Agrostis, Alopecurus, Bromus, Calamagrostis, Festuca, Phleum, Poa, and Trifolium.

The South Dakota Station had an approved project for receiving financial assistance in the same way for collecting native grasses. Effective July 1, 1968, through June 30, 1969, $750. will be available to assist with expenses for collecting work.

6. New Crops Program

Evaluation of new crops for potential industrial utilization was continued in 1968. Several accessions were grown for the first time. However, results were extremely variable. Problems were encountered with viability or germination in the field, unfavorable weather and soil conditions after planting and weakness of plants after they emerged.

7. Public Relations

The Regional Station was visited by about 135 people in 1968. They included representatives from private interests, state and federal representatives, foreign visitors and student classes. Attendees of the North Central Branch of the American Society of Agronomy visited the Regional Station during their meeting in Ames.

SUPPLEMENT I
To
NC-7 Annual Report for 1968

1968 PLANT PATHOLOGY REPORT

North Central Regional Plant Introduction Station
Regional Project NC-7
Ames, Iowa
R. L. Clark

A. Screening for Disease Resistance

1. Corn

Another 310 accessions were inoculated with Diplodia and rated for stalk rot resistance in the field. Among the early maturing accessions (50% tasselled on 7/17), 204850 (54% rot) and 213759 (54% rot) appeared to have good resistance. In the medium maturity group (50% tasselled on 7/31), 195237 (63% rot) 200179 (62% rot), 213695 (62% rot), and 213702 (64% rot) appeared to be resistant. In the moderately late group (50% tasselled on 8/14), 163597 (72% rot), 198896 (74% rot) and 213713 (62% rot) were most resistant. The best of the late maturity group (50% tasselled on 8/28) was 209135 (80% rot). Ratings were based on the percentage of the inoculated internode rotted one month after inoculation. The check varieties, IA4417A and AES704, had 50% tassel on 8/14 and averaged 94% and 84% rot of the inoculated internode respectively.

Rust resistance appeared to be best in I94047 (score 1.38), 194387 (1.38), 197261 (1.33), 198896 (1.25), 198899 (1.38), and 198905 (1.00). Scores were obtained by averaging the scores of the four reps, based on a 1-5 scale, 1 = lowest disease. IA4417A rated 2.25, AES704 rated 1.88.

The outstanding accessions with regard to northern leaf blight resistance were: 196128 (1.75), 196129 (1.75), 196130 (1.88), and 213701 (1.75). IA4417A scored 3.00, AES704 scored 2.75 on the same 1-5 scale.

Four accessions: 198904, 198905, 200286, and 204803, had no smut showing on any of the 40 plants. IA4417A had 3, AES704 had 8 smutted plants out of 40 plants. P.I. 213743 had 31 smutted plants out of 39.

2. Tomato

Another 180 tomato accessions were evaluated in the field for resistance to Rhizoctonia soil rot of the fruits. Fifteen accessions: 128646, 128647, 128648, 128649, 128650, 128651, 128652, 128653, 128654, 128655, 128656, 128657, 128659, 128661, and 128663 showed excellent resistance (rating less than 1 on a 0-5 scale). Unfortunately, all of these are L. peruvianum accessions. P.I. 128639, a suspected L. esculentum x L. pimpinellifolium cross, scored 1.88. Brookston scored 3.33.

3. Alfalfa

Just over 400 accessions were inoculated in the lab for Leptosphaerulina (Pseudoplea) reaction. Only the following 10 looked promising: 229955, 230225, 230607, 233713, 234673, 234787, 234816, 235093, 255884, and 258752. These accessions averaged 1.5 or lower on a 0-5 scale. Ranger scored 3 and Buffalo 4 on the same scale. The above 10 will be tested again.

Five hundred and thirty three accessions were tested in sand benches for resistance to the northern root knot nematode, Meloidogyne hapla. Twenty accessions showing evidence of some resistance in one test also looked good in a second test, while 33 others rated good once, then poor. The 20 accessions mentioned above, along with the 55 additional accessions with low disease scores in the 2nd test will be checked again.

The 20 which may have northern root knot nematode resistance are:

188868	189393	190259	193291	196219
196224	196225	196227	196228	196233
196234	196235	230225	230607	233713
234673	234787	234788	234815	251329

B. Seed-borne Cucurbita Viruses

Eleven Cucurbita accessions had Squash Mosaic Virus transmitted through the seed. The percentage infection ranged from 4 to 50. All diseased plants were destroyed before the Cucurbita were shifted to the field for seed increase planting.

C. Records of Plant Diseases, 1968

In the greenhouse a Fragaria hybrid, P.I. 324182, from Japan, appeared to have either very high resistance or immunity to Sphaerotheca humuli, powdery mildew. Another Japanese accession of Fragaria, 324183, was susceptible.

The Cheyenne privet, P.I. 107630, showed moderately heavy infection by powdery mildew, Microsphaera alni, in the greenhouse. It is also much more susceptible to damage by anthracnose, Glomerella cingulata, than the Amur privet, L. amurense. During periods of high humidity in the greenhouse, twigs of Cheyenne die back as much as 10 cm. after trimming, those of Amur usually less than 1 cm.

Smut, rust, and northern leaf blight were again quite common in the corn and stalk rot was more severe than normal.

Ergot was severe in many of the grasses and head smut on some bromes.

The bacterial leafspot on Scorpiurus is currently being studied to determine the origin and identification of the pathogen. Until we determine where it came from and how it spreads, we are not distributing any Scorpiurus seed.

D. Disease, Nematode, and Insect Resistance Reports

This year the large report on tomato accessions having pest resistance was finished and distributed to cooperators around the country. This was a 62 page report which we had reproduced at the printing shop on campus. All previous summary reports have been mimeographed.

The summary report on corn has been compiled and is now in rough draft form. After being checked over by the other regional Plant Pathologists and Dr. Oakes, it will be ready for final typing, reproduction, and general distribution.

E. Work Planned for Next Year

1. Continue screening corn for stalk rot, smut, leaf blight, and rust resistance.
2. Continue screening tomatoes for soil rot resistance in the field and Septoria resistance in the greenhouse.
3. Continue screening alfalfa for root knot nematode resistance, and attempt to isolate individual plants with resistance to Leptosphaerulina leaf spot. When individuals with leafspot resistance are found, crosses will be made with susceptible individuals to determine the type of inheritance involved.
4. Continue screening tomatoes for root knot resistance in the greenhouse and lab.
5. Check Cucumis and Cucurbita for seed-borne virus.
6. Continue to check sunflower accessions in the field for downy mildew.
7. Take notes on unusual disease occurrences in our plots and identify unknown pathogens.

SUPPLEMENT II
To
NC-7 Annual Report for 1968
1968 ENTOMOLOGY REPORT
North Central Regional Plant Introduction Station
Regional Project NC-7
Ames, Iowa
J. L. Jarvis

1. Peppers screened for resistance to European corn borer

Pepper introductions (Capsicum spp.) were screened in the field and in the greenhouse for resistance to the European corn borer, Ostrinia nubilalis. Fruits were artificially infested with laboratory produced egg masses at the rate of 1 egg mass per fruit. Two accessions of the cultivated pepper C. annuum (PI 105338 and PI 288934) gave some indications in greenhouse tests of being resistant to the European corn borer but need further evaluation. All other accessions of C. annuum were susceptible. All accessions of the pepper C. pendulum were susceptible to the corn borer in greenhouse tests. This is believed to be a new host plant record for this insect. The infestation obtained from artificially infesting peppers in the field was low and the results inconclusive.

In both the field and in the greenhouse there was a tendency for the sweet peppers to be more heavily infested than were the pungent or very pungent peppers. Pimiento and paprika type peppers had a higher percent of the fruits infested than did the bell, chili, cayenne, and ornamental peppers.

2. Crambe screened for resistance to turnip aphid and green peach aphid

Studies were conducted in the greenhouse to determine the potential importance of the turnip aphid, Hyadaphis pseudobrassicae, and the green peach aphid, Myzus persicae, as pests of crambe. Tests demonstrated that both aphids are capable of causing severe damage to crambe under proper environmental conditions.

PI 247310 showed a high level of resistance to the turnip aphid; all other accessions were susceptible. All accessions of crambe were susceptible to the green peach aphid.

3. Mustard and rape oilseed introductions screened for resistance to the turnip aphid

Greenhouse studies were conducted to determine the importance of the turnip aphid, Hyadaphis pseudobrassicae, as a pest of 5 species of mustard and rape oilseed crops. The species tested were oilseed rape (Brassica napus), oriental mustard (B. juncea), black mustard (B. nigra), yellow mustard (B. hirta), and turnip rape (B. campestris).

All accessions of B. napus were susceptible to aphid attack except PI 171538 where a number of resistant plants were noted. Accessions of B. juncea were variable with both resistant and susceptible plants present in all accessions. Accessions of B. nigra were generally resistant; those of B. hirta were highly susceptible. Only 1 plant out of a total of 635 B. campestris plants was resistant to the turnip aphid. This was a selection from PI 173868. Selfed seed has been obtained from this plant and an attempt will be made to develop a line of B. campestris plants that is resistant to the turnip aphid.

4. Spinach screened for resistance to green peach aphid

Greenhouse studies were conducted for the purpose of screening spinach introductions for resistance to the green peach aphid, Myzus persicae. A technique was developed for screening large numbers of plants whereby seedlings were mass infested with aphids.

A total of 2265 spinach plants representing 73 accessions were evaluated for resistance to the green peach aphid. Only 65 of these plants survived for three

weeks following infestation. All were in poor condition due to aphid attack and all were dead within four weeks following infestation. No plants were selected for further evaluation.

Work Planned For 1969

1. Peppers

a) European corn borer. Introductions not previously evaluated will be artificially infested in the field with egg masses of the European corn borer. (In cooperation with the European Corn Borer Laboratory, Ankeny, Iowa).

2. Cucumbers

a) Cucumber beetles. Introductions of Cucumis will be evaluated in the field for resistance to both the spotted cucumber beetle and the striped cucumber beetle. Evaluations will be made in the seedling stage and possibly at a later stage of development.

3. Peas

a) Pea aphid. Introductions of peas will be screened in the greenhouse for resistance to the pea aphid.

4. Cruciferous oilseed crops

a) Turnip aphid. Brassica spp. and other cruciferous oilseed crops will be screened for resistance to the turnip aphid. This insect is known to be especially destructive to seedlings.

5. Other crops

a) Observations will be made on other crops being grown primarily for seed increase, to determine if insect problems are present, and if differences in infestations occur among accessions.