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, 1971

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
Regional Coordinator — W. H. Skrdla, Iowa

State Experiment Stations and Representatives

Nebraska	*J. H. Williams, Chm.	Minnesota	*L. C. Snyder
Alaska	*R. L. Taylor	Missouri	*A. D. Hibbard
Illinois	*E. B. Patterson	North Dakota	*G. A. Peterson
Indiana	*K. J. Lessman, Sec'y	Ohio	*M. H. Niehaus
Iowa	*I. T. Carlson	South Dakota	*R. M. Peterson
Kansas	*C. E. Wassom	Wisconsin	*W. H. Gabelman
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	*R. S. MacLauchlan
Northern Utilization Research & Dev. Div.	*W. H. Tallent
U.S. Forest Service	*D. H. Dawson
Entomology Research Division	*J. L. Jarvis, Iowa

*Voting members of NC-7 Technical Committee

North Central Regional Plant Introduction Station Staff, 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) Corn

(a) Because of the Southern corn leaf blight outbreak, there has been an increased interest in corn introductions in search of new sources of male sterility. Considerable work of this nature is being done at the Illinois Station. Approximately 20 corn introductions containing sterile cytoplasm were classed as to type of cytoplasm.

(b) Also from Illinois was reported that PI 214279, a Gaspe flint from Canada, carries female sterility.

(2) Proso Millet

(a) A single plant selection from PI 222811 from Iran was released as the variety 'Akron' by the Colorado Station. It is a red selection having high yield with good vigor. Because of the seed color, it is expected to be used largely for bird feed.

(b) A single plant selection from PI 223794 was released as the variety 'Leonard', also by the Colorado Station. The selection has tan or yellow seed, is fine stemmed and very leafy with an open head. It has high yields and heavy test weight.

(3) Alfalfa

(a) Twenty-one alfalfa introductions, representing five species, were used at the Wisconsin Station in a study of seed protein phenotypes as identified by serological electrophoretic techniques. Such a technique would be useful in genetics, breeding, and taxonomic research. Comparisons were made with diploids, tetraploids, and cultivated alfalfa. The development of the technique appears feasible and alfalfa introductions could be used in that technique.

(b) A genetic male sterile (not cytoplasmic) was isolated in Minnesota from PI 178980, an alfalfa from Turkey. The clone is very vigorous but is a poor seed producer. Its progeny is very vigorous and further evaluation is in progress.

(4) Birdsfoot Trefoil

Two trefoil introductions from USSR contributed to the variety 'Carroll' released by the Iowa Station in honor of the late Dr. Carroll P. Wilsie who developed it. 'Carroll' is a synthetic variety derived from PI 228151 (Kubanian 44) and 258467 (Morshansk 528) and is a winterhardy pasture type.

(5) Redclover

Two highly rust resistant clones were selected from each of two redclover introductions at the Wisconsin Station. One was PI 210370 from Iran and the other, 304784 var. 'Ulva', from Sweden. All four clones are being used to determine the inheritance of rust resistance. One rust resistant clone from 304784 is self-compatible.

(6) Bean

One of the breeding lines developed from crosses between PI 165078 (resistant to wilt) and 'Great Northern 1140', described in the 1970 annual report, was released by the Nebraska Station as the variety 'Emerson'.

(7) Peas

Twenty-five pea introductions were found to be tolerant to Pea Seedborne Mosaic Virus at the Wisconsin Station. Of these, two introductions (193586 and 193585) remained symptomless under repeated tests.

(8) Tomatoes

(a) PI 303801, 'Peru Wild VR' from Utah, contributed wilt resistance and 128657, from Peru, contributed root knot nematode resistance to the variety 'Pakmor' released by the University of California.

(b) PI 204996 from West Virginia contributed late blight resistance to 'Ottawa 30', one of the parents used in 'Mini-Rose', a pink cherry tomato released by the Ottawa Research Station, Canada.

(c) Fifty-one tomato introductions were evaluated for resistance to ozone at the USDA Plant Industry Station. Of these, four were tolerant and fifteen were intermediate in tolerance to ozone. The rest were susceptible. This represents a step toward tailoring plants to survive under certain conditions of pollution in the atmosphere.

(d) Resistance genes for Cladosporium leaf mold were obtained from six tomato introductions in Ontario, Canada. All incorporate moderate to high resistance to race 12 of C. fulvum. The gene from PI 187002, Guatemala, has been designated Cf-5. PI 309906, Guatemala, is immune to four races of leaf mold in greenhouse tests.

(e) Two tomato introductions were reported from Wyoming as having a high level of resistance to bacterial canker. A third was reported as having moderate resistance. In North Carolina, use was made of the high level resistance in PI 251305, Ecuador, by using it in a breeding program.

(9) Watermelon

The Kansas Station reported PI 248774 from Southwest Africa as being highly resistant to anthracnose. It was crossed with the Kansas Crimson Sweet watermelon to transfer resistance to this variety.

(10) Sunflowers

(a) Germ plasm from three introductions segregating for recessive genetic male sterility and six introductions having potential for rust resistance were released in 1971.

(b) Several accessions of North American sunflower, Helianthus annuus were added to the sunflower collection. These trace back to various Indian tribes, like Arikara, Hopi, Seneca, and others and represent the first indigenous H. annuus to be added to the collection. The seed was received from C. B. Heiser of the University of Indiana, who obtained some of it from George Will, North Dakota.

The above reports represents some of the more important and significant use made of plant introductions. Additional reports which contain more detail are presented in Appendix C.

b. Accomplishments at the Regional Station

New agronomic, horticultural, and industrial plant introductions received in 1971 totaled about 880 plus about 30 ornamentals for a total of 910 items. For seed increase and revitalization, about 2800 accessions were grown plus 800 carryover accessions of perennial crops. Over 8500 seed packets and ornamental plants were distributed. Over 16,000 introductions are on the active inventory and nearly 14,500 are available for distribution.

Plant introductions were evaluated in the field and greenhouse for diseases and nematodes:

(1) Corn

310 accessions of corn were field screened for resistance to stalk rot, rust and smut. Northern corn leaf blight was very light this year so no data were taken.

Of the 310 lines tested for stalk rot, 19 showed less than 75% of the inoculated internode rotted one month after inoculation. One was 64% rotted and the two checks were 70% and 74% rotted, respectively.

Rust observations on these same plants showed eight accessions having little or no rust.

Smut observations showed that three lines, 267167, 270297, and 279029 have a degree of smut resistance.

(2) Tomato

Only PI 193407, out of 180 accessions tested, showed promise of having fruit rot resistance in the 1971 tests.

(3) Alfalfa

225 alfalfa introductions are being evaluated in the greenhouse for reaction to northern root knot nematode and Leptosphaerulina leafspot.

(4) Cucumber

42 introductions are being re-evaluated for powdery mildew resistance. PI's 147065, 197088, and 288238 had the highest resistance.

(5) Crambe

Alternaria has affected field plantings of crambe in areas of production. Before evaluations for Alternaria resistance can be initiated, a satisfactory technique must be developed. This is now being worked on.

More detail on disease work at the Regional Station is available in Supplement I of this report.

Insect resistance evaluations were made in the field and greenhouse.

(1) Pepper introductions were evaluated in the field for resistance to larvae of the European corn borer. Results showed that the most important factor influencing resistance to the borer appears to be pungency. When artifical capsaicin, the pungent principle, was incorporated into a diet and fed to newly hatched larvae, survival was greatly reduced, to as low as 0.062%.

(2) Peppers were also screened in the greenhouse for green peach aphid resistance, but all were susceptible.

(3) Corn introductions were screened in the field for resistance to 2nd generation larvae of the European corn borer. PI's 222612 and 222643, both from Kansas, show promise of resistance.

More detail on insect work at the Regional Station is available in Supplement II of this report.

For evaluation of ornamentals, 1703 plants of 19 species and accessions were distributed to trial sites in the NC Region. Of these 19, six were seedlings and the rest were vegetatively propagated items from state, federal, and private cooperators. Eleven five-year reports, summarizing results of 12 accessions from 30 test sites in the region, were prepared and distributed.

The importance of having numerous unrelated tree species available for urban and rural street and shade tree plantings is evident as more of the frequently planted native elms die. An attempt is being made through the Regional Program to accumulate diverse native and introduced small tree species. These will be propagated and grown at the Regional Station for observation and possible use in regional trials.

c. Domestic Exploration

The exploration for native grasses in South Dakota continued in 1971. In 1970, 132 plants from 50 colonies were collected, making a total of 434 plants for 1969 and 1970. Information is not yet available for 1971 but the work will continue in 1972 with the purpose of selecting genotypes suitable for production of synthetic varieties useful for pasture during the summer season.

PI numbers were assigned to 14 more Poa and 50 Festuca accessions collected in Alaska. These are available for distribution.

d. Regional Cooperative Program

The Ohio Station assisted with the increase and evaluation of 120 new tomato introductions. The Nebraska and Indiana Stations continue to evaluate new alfalfa introductions for insect resistance.

4. USEFULNESS OF FINDINGS:

Plant introductions continue to provide valuable germ plasm 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 plant introductions and dissemination of information and seed helps to better serve crops workers. The permanent maintenance of plant introductions assures a valuable germ plasm pool for present and future use.

5. WORK PLANNED FOR NEXT YEAR:

a. Continue (1) program of seed increase, storage, preliminary evaluation; (2) pathology and entomology screening work; (3) local and regional testing of new crops and ornamentals; and (4) coordination of cooperative program.

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

c. Initiate assistance with native exploration for pecans in the southern part of the Region.

6. PUBLICATIONS ISSUED OR MANUSCRIPTS PREPARED DURING THE YEAR:

Publications that concern information from the North Central Region on plant introductions are listed below. Publications from other regions on NC-7 primary maintenance crops are listed in Appendix A.

a. Regional Station Publications

(1) Dodge, A. F. 1971. Five-year report on regional plantings of woody ornamental and shelter plants in the North Central Region, 1965-1969. Loose Leaf Notebook, North Central Regional Plant Introduction Station, Ames, Iowa. 80 pp., 11 maps.

(2) White, G. A., B. C. Willingham, W. H. Skrdla, J. H. Massey, J. J. Higgins, W. Calhoun, A. M. Davis, D. D. Dolan, and F. R. Earle. 1971. Agronomic evaluation of prospective new crop species. Econ. Bot. 25(1):22-43.

b. State Station Publications

(1) Nebraska

(a) Coyne, D. P. and M. L. Schuster. 1971. Introduction of a new, large-seeded, bacterial wilt-tolerant Great Northern dry bean variety 'Emerson' in March 1971. Vegetable Res. Rep., Nebraska Agr. Exp. Sta., Dept. of Hort. and Forestry PR 84:9-17.

(b) Coyne, D. P., M. L. Schuster, and C. C. Gallegos B. 1971. Inheritance and linkage of the halo blight systemic chlorosis and leaf water-soaked reaction in Phaseolus vulgaris L. variety crosses. Vegetable Res. Rep., Nebraska Agr. Exp. Sta., Dept. of Hort. and Forestry PR 84:18-19.

(c) Steadman, J. R. and D. P. Coyne. 1971. Evaluation of bean breeding lines for root rot resistance at Scotts Bluff. Vegetable Res. Rep., Nebraska Agr. Exp. Sta., Dept. of Hort. and Forestry PR 84:63.

(2) Ohio

(a) Alexander, L. J. and G. L. Oakes. 1970. New tomato varieties resistant to TMV. Ohio Report 55(2):32-35.

(3) South Dakota

(a) Ross, J. G. 1971. Native grasses may hold key. S. Dakota Farm and Home Res. 22(3):3 and 18.

c. Journal Articles

(1) Illinois

(a) Beckett, J. B. 1971. Classification of male-sterile cytoplasms in maize (Zea mays L.). Crop Sci. 11(5):724-727.

(b) Smith, D. R., A. L. Hooker, S. M. Lim, and J. B. Beckett. 1971. Disease reaction of thirty sources of cytoplasmic male sterile corn to Helminthosporium maydis race T. Crop Sci. 11(5):772-773.

(2) Indiana

(a) Frederiksen, R. A., A. J. Bockholt, L. Reyes, and A. J. Ullstrup. 1971. Reaction of selected midwestern corn inbred lines to Sclerospora sorghi. Plant Disease Reptr. 55(3):202-203.

(3) Kansas

(a) Hackerott, H. L., T. L. Harvey, and W. M. Ross. 1969. Greenbug resistance in sorghums. Crop Sci. 9(5):656-658.

(b) Hackerott, H. L. and T. L. Harvey. 1970. Resistance to greenbug in three millet species. Agron. J. 62(5):574-575.

(c) Harvey, T. L. and H. L. Hackerott. 1969. Recognition of a greenbug biotype injurious to Sorghum. J. Econ. Entomol. 62(4):776-779.

(d) Sharma, G. C. and C. V. Hall. 1971. Influence of cucurbitacins, sugars, and fatty acids on cucurbit susceptibility to spotted cucumber beetle. J. Amer. Soc. Hort. Sci. 96(5):675-680.

(4) Minnesota

(a) Troyer, A. F. and W. B. Ambrose. 1971. Plant characteristics affecting drying rate of ear corn. Crop Sci. 11(4):529-531.

(5) Missouri

(a) Ibarbia, E. A. and V. N. Lambeth. 1970. Tomato fruit pH and Brix: selection progress in early generations. Tomato Genet. Coop. Rep. 20:18-19.

(b) Helm, J. L., A. V. Paez, P. J. Loesch, and M. S. Zuber. 1971. Test weight in high-amylose corn. Crop Sci. 11(1):75-77.

(6) Nebraska

(a) Coyne, D. P., M. L. Schuster, and C. C. Gallegos. 1971. Inheritance and linkage of the halo blight systemic chlorosis and leaf watersoaked reaction in Phaseolus vulgaris variety crosses. Plant Disease Reptr. 55(3):203-207.

(b) Manglitz, G. R., H. J. Gorz, and H. J. Stevens, Jr. 1971. Biology of the sweetclover root borer. J. Econ. Entomol. 64(5):1154-1158.

(7) North Dakota

(a) Statler, G. D. 1970. Resistance of bean plants to Fusarium solani f. phaseoli. Plant Disease Reptr. 54(8):698-699.

(8) Ohio

(a) Alexander, L. J. 1971. Host-pathogen dynamics of tobacco mosaic virus on tomato. Phytopathology 61(6):611-617.

(9) South Dakota

(a) Herman, D. E. and N. P. Evers. 1971. Caragana 'Globe', worthy clone for northern landscapes. Amer. Nurseryman April:7.

(10) Wisconsin

(a) Bingham, E. T. and K. J. Yeh. 1971. Electrophoretic patterns among alfalfa seed proteins from selected varieties, experimental stocks, and species accessions. Crop Sci. 11(1):58-61.

(b) Hagedorn, D. J. and R. E. Rand. 1971. Reaction of Pisum sativum to the water congestion disease. Plant Disease Reptr. 55(6):533-535.

(c) Sequeira, L. 1970. Resistance to corky root rot in lettuce. Plant Disease Reptr. 54(9):754-758.

(d) Shanmugasundaram, S., P. H. Williams, and C. E. Peterson. 1971. Inheritance of resistance to powdery mildew in cucumber. Phytopathology 61(10): 1218-1221.

(e) Stevenson, W. R. and D. J. Hagedorn. 1971. Reaction of Pisum sativum to the pea seedborne mosaic virus. Plant Disease Reptr. 55(5):408-410.

(f) Watterson, J. C., P. H. Williams, and R. D. Durbin. 1971. Response of cucurbits to Erwinia tracheiphila. Plant Disease Reptr. 55(9):816-819.

(11) USDA, Beltsville

(a) Barksdale, T. H. 1970. Inheritance of resistance to tomato anthracnose. Phytopathology 60(9):1283 (abstract).

(b) Barksdale, T. H. 1971. Inheritance of tomato anthracnose resistance. Plant Disease Reptr. 55(3):253-256.

(c) Barksdale, T. H. 1971. Field evaluation for tomato early blight resistance. Plant Disease Reptr. 55(9):807-809.

(d) Gentile, A. G., W. A. Feder, R. E. Young, and Z. Santner. 1971. Susceptibility of Lycopersicon spp. to ozone injury. J. Amer. Soc. Hort. Sci. 96(1):94-96.

(e) Gentile, A. G. and Z. Santner. 1971. Germination of pollen of Lycopersicon spp. and Solanum penelii on a solid artificial medium. Tomato Genet. Coop. Rep. 21:16-18.

(f) Orellana, R. G. and J. E. Bear. 1963. Rust on sunflower introductions at Beltsville, Maryland. Plant Disease Reptr. 47(1):45.

(g) Singh, R. P. and M. J. O'Brien. 1970. Additional indicator plants for potato spindle tuber virus. Amer. Potato J. 47(10):367-371.

(h) Webb, R. E., A. K. Stoner, and A. G. Gentile. 1971. Resistance to leaf miners in Lycopersicon accessions. J. Amer. Soc. Hort. Sci. 96(1):65-67.

7. APPROVED:

January 20, 1972
Date

J. H. Williams

Chairman, Technical Committee
J. H. Williams

January 20, 1972
Date

E. F. Frolik

Regional Administrative Adviser
E. F. Frolik

MISCELLANEOUS PUBLICATIONS

1. Regional Publications in Manuscript

a. Jarvis, J. L. and W. D. Guthrie. Effect of horticultural characteristics on damage by larvae of the European corn borer. In press.

b. Skrdla, W. H. New Crops -- food for the future? Proc. Amer. Soc. Hort. Sci. In press.

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

a. Alfalfa

(1) Kawagucki, I. I. and D. F. Beard. 1971. Registration of WL 508 Alfalfa. Crop Sci. 11(4):600.

(2) Kawagucki, I. I. and D. F. Beard. 1971. Registration of WL 504 Alfalfa and WL 508 Alfalfa. Crop Sci. 11(4):600.

b. Millet

(1) Hinze, G. 1970. Three new millet varieties for Colorado. Colorado Agr. Exp. Sta. Prog. Rep. PR 70-36, 2 pages.

(2) Hinze, G., K. Takeda, and T. E. Hans. 1971. Registration of Akron proso millet. Crop Sci. 11(4):602.

(3) Hinze, G., K. Takeda, and T. E. Hans. 1971. Registration of Leonard proso millet. Crop Sci. 11(4):602.

c. Tomatoes

(1) Henderson, R. W. 1971. New tomatoes resistant to bacterial wilt. Research and Farming 29(3-4):10.

(2) Robbins, M. L. and F. F. Angell. 1970. Tomato anthracnose: a hypodermic inoculation technique for determining genetic reaction. J. Amer. Soc. Hort. Sci. 95(1):118-119.

(3) Robbins, M. L. and F. F. Angell. 1970. Tomato anthracnose: inheritance of reaction to Colletotrichum coccodes in Lycopersicon spp. J. Amer. Soc. Hort. Sci. 95(4):469-471.

(4) Robinson, R. W., O. H. Pearson, and W. B. Robinson. 1971. Potential of L. pimpinellifolium as a parent for high consistency. Tomato Genet. Coop. Rep. 21:37-38.

(5) Thyr, B. D. 1971. Resistance to Corynebacterium michiganense measured in six Lycopersicon accessions. Phytopathology 61(8):972-974.

3. Publications from Canada

a. Kerr, E. A., Z. A. Patrick, and D. L. Bailey. 1971. New genes for resistance to leaf mold - Cladosporium fulvum. Tomato Genet. Coop. Rep. 21:19.

b. Patrick, Z. A., E. A. Kerr, and D. L. Bailey. 1971. Two races of Cladosporium fulvum new to Ontario and further studies of Cf_1 resistance in tomato cultivars. Can. J. Bot. 49(2):189-193.

Inventory and Summary of Accessions Maintained and Received through 1971

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971*	Rec'd 1971	Total Active Dec. 31 1971	Seed List 1972	**To Be Increased	Packets Distributed
GRASSES & FIELD CROPS							
Aegilops	163	0	0	163	155	8	171
Agropyron	181	1	0	180	178	2	2
Agrostis	134	2	1	133	126	7	7
Alopecurus	44	0	0	44	42	2	1
Apera	6	0	0	6	6	0	0
Arrhenatherum	14	0	0	14	12	2	0
Boissiera	1	1	0	0	0	0	0
Brachiaria	1	1	0	0	0	0	0
Brachypodium	5	1	0	4	0	4	0
Bromus	547	1	71	617	534	83	75
Calamagrostis	18	1	0	17	10	7	0
Clinelymus	2	0	0	2	0	2	0
Cynosurus	8	0	0	8	8	0	0
Dactylis	415	6	0	409	388	21	25
Danthonia	1	0	0	1	0	1	0
Echinochloa	24	1	0	23	23	0	29
Eremopoa	3	0	0	3	1	2	0
Eremopyrum	12	0	0	12	12	0	0
Eriachne	1	0	0	1	0	1	0
Festuca	202	6	0	196	194	2	203
Gaudiniopsis	1	0	0	1	1	0	0
Glyceria	4	0	0	4	4	0	0
Helictotrichon	8	1	1	8	7	1	1
Heteranthelium	5	0	0	5	4	1	0
Hordeum	7	0	0	7	7	0	8
Koeleria	9	0	0	9	7	2	1
Lasiagrostis	1	0	0	1	0	1	0
Lolium	129	129	0	0	0	0	132
Milium	2	0	0	2	0	2	0
Nardus	4	0	0	4	2	2	0
Neurachne	1	1	0	0	0	0	0
Panicum	249	3	2	248	240	8	358
Phalaris	76	0	13	89	81	8	22
Phleum	48	0	0	48	48	0	1
Poa	51	0	0	51	51	0	152
Polypogon	13	0	0	13	11	2	1
Puccinellia	3	0	0	3	3	0	0
Schedonnardus	1	0	0	1	1	0	2
Secale	4	0	0	4	4	0	0
Setaria	162	9	8	161	138	23	152
Sorghum	31	0	0	31	31	0	22
Stipa	1	0	0	1	0	1	0
Tetrachne	1	0	0	1	0	1	0
Tricholaena	3	0	2	5	1	4	0
Tridens	2	0	0	2	0	2	2
Tripsacum	2	0	0	2	2	0	1
Triticum	2	0	0	2	2	0	2
Urochloa	1	0	0	1	0	1	0
Zea mays--Introd.	2159	5	115	2269	2196	73	1579
St. O.P. Coll.	259	0	1	260	260	0	---
TOTAL ZEA MAYS	2418	5	116	2529	2456	73	1579
TOTALS:Genera-49	5021	169	214	5066	4790	276	2941

*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 1971	Removed from Inventory 1971*	Rec'd 1971	Total Active Dec. 31 1971	Seed List 1972	**To Be Increased	Packets Distributed
LEGUMES							
Amphicarpa	3	0	0	3	0	3	0
Astragalus	62	1	0	61	58	3	20
Coronilla	52	1	0	51	44	7	74
Dalea	9	0	0	9	8	1	2
Dorycnium	1	0	0	1	1	0	1
Galega	12	1	2	13	5	8	0
Genista	2	0	0	2	0	2	0
Glycyrrhiza	1	0	0	1	0	1	0
Lathyrus	287	12	71	346	231	115	10
Lespedeza	36	0	3	39	32	7	33
Lotus	181	0	1	182	176	6	3
Medicago	876	2	14	888	877	11	329
Melilotus	526	6	4	524	360	164	7
Onobrychis	79	5	0	74	69	5	5
Ononis	6	0	0	6	6	0	7
Psoralea	21	0	0	21	19	2	4
Scorpiurus	45	0	0	45	26	19	0
Tetragonolobus	20	1	0	19	13	6	4
Trifolium	462	0	0	462	457	5	28
Trigonella	162	0	0	162	148	14	156
Vicia	1	1	0	0	0	0	1
TOTALS:Genera-21	2844	30	95	2909	2530	379	684
FRUITS & VEGETABLES							
Allium	200	34	0	166	165	1	31
Apium	58	0	0	58	58	0	0
Asparagus	54	0	2	56	39	17	6
Beta	304	1	19	322	304	18	419
Carica	3	2	0	1	0	1	0
Citrullus	2	0	0	2	0	2	0
Cucumis	521	0	49	570	504	66	692
Cucurbita	407	6	59	460	425	35	579
Daucus	360	4	14	370	304	66	282
Fragaria	2	0	0	2	0	2	0
Lycopersicon	3495	0	232	3727	3552	175	1428
Pastinacea	0	0	6	6	0	6	5
Petroselinum	94	9	24	109	75	34	1
Phaseolus	1	0	0	1	0	1	0
Pisum	1316	0	103	1419	1309	110	227
Rheum	7	0	0	7	2	5	2
Rubus	84	0	0	84	84	0	0
Solanum	1	0	9	10	0	10	0
Spinacia	194	1	18	211	190	21	358
Vaccinium	3	0	0	3	3	0	0
TOTALS:Genera-20	7106	57	535	7584	7014	570	4030
OIL & SPECIAL							
Adonis	4	0	0	4	0	4	0
Alyssum	1	0	0	1	1	0	0
Ammi	2	0	0	2	2	0	0
Anethum	50	12	3	41	30	11	32
Arctium	1	0	0	1	1	0	0

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971	Rec'd 1971	Total Active Dec. 31 1971	Seed List 1972	**To Be Increased	Packets Distributed
OIL & SPECIAL (continued)							
Lepidium	1	0	0	1	1	0	0
Limnanthes	17	0	0	17	17	0	3
Limnosciadium	1	0	0	1	0	1	0
Lobularia	1	0	0	1	0	1	0
Lunaria	1	0	0	1	0	1	0
Madia	1	0	0	1	0	1	0
Mentha	11	1	0	10	10	0	15
Monarda	4	0	0	4	3	1	0
Mosla	1	0	0	1	1	0	1
Oenothera	1	0	0	1	0	1	0
Onosma	1	0	0	1	0	1	0
Orlaya	2	0	0	2	0	2	0
Osteospermum	1	0	0	1	0	1	0
Perilla	9	0	0	9	9	0	11
Petroselinum	1	0	0	1	0	1	0
Picris	3	0	0	3	3	0	0
Prionosciadum	1	0	0	1	0	1	0
Raphanus	8	0	0	8	8	0	8
Rhaponticum	2	0	0	2	0	2	0
Ricinus	10	0	0	10	0	10	0
Rochelia	1	0	0	1	0	1	0
Rudbeckia	1	0	0	1	1	0	0
Satureja	6	0	0	6	6	0	2
Schlechtendalia	2	0	0	2	0	2	0
Sesamun	5	0	0	5	0	5	0
Sideritis	2	0	0	2	2	0	0
Sigesbeckia	1	0	0	1	0	1	0
Sisymbrium	1	0	0	1	0	1	0
Spergula	1	0	0	1	1	0	1
Stenachaenium	2	0	0	2	0	2	0
Stokesia	3	0	0	3	0	3	0
Symphytum	1	0	0	1	1	0	0
Tephrosia	2	0	0	2	0	2	0
Thalictrum	8	0	8	16	0	16	0
Thlaspi	1	0	0	1	0	1	0
Trachyspermum	1	0	0	1	0	1	0
Vaccaria	1	0	0	1	1	0	0
Vernonia	4	0	0	4	4	0	1
TOTALS:Genera-95	1197	38	32	1191	1024	167	555

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971	Rec'd 1971	Total Active Dec. 31 1971	Seed List 1972	**To Be Increased	Packets Distributed
OIL & SPECIAL (continued)							
Atractylis	1	0	0	1	0	1	0
Berteroa	2	0	0	2	2	0	1
Bifora	1	0	0	1	1	0	0
Biscutella	1	0	0	1	0	1	0
Brassica	499	25	6	480	459	21	82
Briza	4	0	0	4	0	4	0
Bupleurum	2	0	0	2	0	2	0
Calamintha	1	0	0	1	1	0	0
Calendula	3	0	0	3	2	1	0
Caltha	1	0	0	1	0	1	0
Camelina	8	0	0	8	7	1	0
Cardamine	1	0	0	1	0	1	0
Cassia	6	0	0	6	6	0	0
Caucalis	1	0	0	1	0	1	0
Centranthus	1	0	0	1	0	1	0
Cephalaria	2	0	0	2	0	2	0
Chamaepeuce	1	0	0	1	0	1	0
Chenopodium	3	0	0	3	0	3	0
Christolea	1	0	0	1	0	1	0
Chrysanthemum	1	0	0	1	0	1	0
Cichorium	2	0	0	2	2	0	0
Cnicus	1	0	0	1	1	0	0
Crambe	40	0	6	46	33	13	0
Crepis	2	0	0	2	0	2	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
Cynoglossum	1	0	0	1	1	0	0
Daucus	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	2	0	0	2	2	0	2
Eruca	32	0	0	32	32	0	0
Eryngium	5	0	0	5	4	1	0
Euphorbia	12	0	0	12	12	0	0
Foeniculum	3	0	0	3	3	0	2
Glaucium	1	0	0	1	1	0	0
Goldbachia	1	0	0	1	0	1	0
Guizotia	1	0	0	1	0	1	0
Helenium	1	0	0	1	1	0	0
Helianthus annuus	335	0	1	336	327	9	392
Helianthus sp.	10	0	8	18	18	0	1
Heracleum	2	0	0	2	1	1	1
Hibiscus (Kenaf)	1	0	0	1	0	1	0
Iberis	2	0	0	2	0	2	0
Impatiens	2	0	0	2	0	2	0
Isatis	2	0	0	2	0	2	0
Lallemantia	2	0	0	2	1	1	0
Lappula	2	0	0	2	2	0	0
Lapsana	3	0	0	3	3	0	0
Leonotis	1	0	0	1	0	1	0

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971*	Rec'd 1971	Total Active Dec. 31 1971	Plants Distributed 1971
ORNAMENTALS					
Abeliophyilum	1	0	0	1	0
PI Abies	2	0	0	2	0
PI Acer	4	0	3	7	0
PI Agapanthus	1	0	0	1	0
PI Alnus	6	0	3	9	0
PI Amelanchier	4	0	0	4	0
Amorpha	3	0	0	3	1
PI Ardisia	1	0	0	1	0
PI Armeria	1	1	0	0	0
PI Aronia	1	0	1	2	104
PI Aruncus	1	0	0	1	0
PI Begonia	4	0	0	4	0
PI Belamcanda	1	0	0	1	0
PI Betula	5	0	0	5	118
Buxus	12	0	0	12	0
PI Callicarpa	2	0	0	2	0
PI Camellia	1	0	0	1	0
Caragana	2	0	0	2	0
PI Carica	3	0	0	3	0
PI Carpinus	1	0	0	1	0
Caryopteris	1	0	0	1	0
Castanea	1	0	0	1	0
Celastrus	2	0	0	2	0
PI Cercocarpus	3	0	0	3	0
Chaenomeles	1	0	0	1	0
PI Chamaebataria	3	0	0	3	0
Chionanthus	1	0	0	1	0
PI Chrysanthemum	8	0	0	8	0
PI Clematis	2	0	0	2	0
PI Clethra	1	0	0	1	0
PI Coleus	19	0	9	28	54
PI Colutea	1	0	0	1	0
PI Cornus	15	0	0	15	0
Corylus	1	0	0	1	54
PI Cotoneaster	13	0	0	13	0
PI Crataegus	8	0	0	8	0
PI Cupressus	7	0	0	7	8
PI Cytisus	5	0	0	5	0
PI Dammacanthus	1	0	0	1	0
PI Dasylirion	1	0	0	1	0
PI Deutzia	3	0	0	3	0
PI Dianthus	8	0	0	8	0
PI Dierama	1	0	0	1	0
Dirca	1	0	0	1	0
PI Duchesnea	2	0	0	2	0
Elaeagnus	2	0	0	2	0
Elsholtzia	1	0	0	1	0
PI Euonymus	11	0	0	11	0
PI Euphorbia	1	0	0	1	0
PI Evodia	0	0	1	1	0
PI Foresteria	1	0	0	1	0
PI Forsythia	2	0	0	2	0

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971*	Rec'd 1971	Total Active Dec. 31 1971	Plants Distributed 1971
ORNAMENTALS (continued)					
Fothergilla	1	0	0	1	0
PI Fraxinus	4	0	0	4	0
PI Gaultheria	1	0	0	1	0
PI Genista	2	0	0	2	0
Gleditsia	1	0	0	1	0
PI Haemanthus	1	0	0	1	0
PI Hedera	3	0	0	3	0
Helianthilla	1	0	0	1	0
PI Hemiptelea	1	0	0	1	0
Hippophae	2	0	0	2	0
PI Hydrangea	3	0	0	3	0
PI Hypericum	5	0	0	5	0
PI Ilex	8	0	0	8	0
Indigofera	1	0	0	1	0
PI Iris	7	0	0	7	0
PI Juglans	1	0	0	1	0
PI Juniperus	6	0	1	7	0
PI Kohleria	1	0	0	1	0
PI Ligustrum	10	0	0	10	0
PI Lilium	1	0	0	1	0
PI Lindera	1	0	0	1	0
PI Lippia	1	0	0	1	0
Lonicera	10	0	0	10	100
PI Lycium	1	0	0	1	0
Lythrum	1	0	0	1	0
PI Maackia	2	0	0	2	0
Malus	12	0	0	12	95
PI Marabilis	1	0	0	1	0
Medicago	1	0	0	1	0
PI Metasequoia	1	0	0	1	0
PI Mimulus	1	0	0	1	0
PI Morus	1	0	0	1	0
PI Orlaya	1	0	0	1	0
Ostrya	1	0	0	1	0
Pachistima	1	0	0	1	0
PI Passiflora	1	0	0	1	0
Penstemon	10	0	0	10	0
PI Peraphyllum	1	0	0	1	0
PI Pelargonium	1	0	0	1	0
PI Phellodendron	0	0	1	1	0
PI Philadelphus	6	0	1	7	94
Photinia	2	0	0	2	0
Physocarpus	1	0	0	1	0
PI Pinus	8	0	2	10	344
PI Polygonum	1	0	0	1	0
Potentilla	6	0	0	6	231
Prunus	2	0	1	3	0
Ptelea	1	0	0	1	0
Pyracantha	1	0	0	1	0
Pyrus	3	0	0	3	0
Quercus	2	0	0	2	0
Rhamnus	3	0	0	3	0

Genera	Total Active Jan. 1 1971	Removed from Inventory 1971*	Rec'd 1971	Total Active Dec. 31 1971	Plants Distributed 1971
ORNAMENTALS (continued)					
Rhododendron	26	0	3	29	56
Rhus	1	0	0	1	0
Robinia	1	0	0	1	0
Rosa	14	0	0	14	0
Rubus	2	0	0	2	0
Salix	4	0	0	4	0
Salmea	1	0	0	1	0
Salvia	1	0	0	1	0
Sambucus	2	0	0	2	0
Sanguisorba	1	0	0	1	0
Scabiosa	2	0	0	2	0
Securinega	2	0	0	2	0
Sedum	1	0	0	1	0
Sheperdia	2	0	0	2	0
PI Sophora	2	0	0	2	0
Sorbus	5	0	0	5	0
Spiraea	6	0	0	6	0
Stachyurus	1	0	0	1	0
Strobilanthes	1	0	0	1	0
Symplocos	1	0	0	1	0
Syringa	8	0	0	8	0
PI Taiwania	1	0	0	1	0
Taxus	4	0	0	4	0
Thuja	2	0	0	2	0
Ulmus	39	0	1	40	432
Viburnum	6	0	0	6	0
PI Verbena	1	0	0	1	0
PI Viola	1	0	0	1	0
Weigela	2	0	0	2	0
Xanthorhiza	1	0	0	1	0
PI Yucca	7	0	0	7	0
Zanthoxylum	0	0	1	1	0
Zelkova	0	0	2	2	0
TOTALS:Genera-137	476	1	30	505	1690

MISCELLANEOUS INFORMATION NOT INCLUDED IN MAIN BODY OF 1971 NC-7 ANNUAL REPORT

1. Regional Station Production Program

The 1971 growing season is the twenty-fourth since the establishment of the Regional Station at Ames on December 1, 1947.

The following summary shows the rainfall and temperature ranges for the spring, summer and fall months of 1971. We maintain a small weather station at the Plant Introduction Farm, so the data represents temperatures and rainfall at the farm. Daily records are kept.

Month	Total Rainfall (inches)	Temperature Ranges, F.	
		Minimum	Maximum
April	1.08	12	84
May	3.99	32	88
June	4.14	49	98
July	3.79	45	91
August	.58	45	96
September	1.43	34	94
October	3.46	33	91
November	2.60	16	68

The first snowfall (3") was received on November 28, and was preceded by rain.

A summary of the number of accessions grown in 1971, compared with 1970, is provided in Table I.

Table I. Number of Genera and Accessions of Various Crops Grown at the Regional Station in 1971.

Crop	No. of Genera		No. of Accessions	
	1970	1971	1970	1971
Grasses	16	24	500	538
Legumes	11	16	636	645
Vegetables	8	8	665	763
Ornamentals	138	140	473	485
Special Crops	24	32	276	279
TOTAL	197	220	2,550	2,710
Carryover of perennial accessions			700	750
Total for Season			3,320	3,250

Special Purpose Plantings

Corn borer resistance evaluations (corn)	100 acc.	
Corn borer resistance evaluations (peppers)	150 acc.	
Corn disease resistance evaluations	310 acc.	1,240 plots
Tomato disease resistance evaluations	180 acc.	720 plots
TOTALS	840 acc.	1,960 plots

2. Total Seed and Plant Inventory for 1971

An inventory of accessions on hand in 1971 appears in Appendix B. A summary of that inventory appears in Table II below.

Table II. Summary of Appendix B.

Crop	Total Active 1/1/71 Genera	Total Active 1/1/71 Accessions	Removed from Inventory 1971	Rec'd 1971	Total Active 12/31/71	Seed List 1971	To Be Increased	Pkts. Plants Distributed 1971
Grasses	49	5,021	169	214	5,066	4,790	276	2,941
Legumes	21	2,844	30	95	2,909	2,530	379	684
Vegetables	20	7,106	57	535	7,584	7,014	570	4,030
Oil & Special	95	1,197	38	32	1,191	1,024	167	555
TOTALS	185	16,168	294	876	16,750	15,358	1,392	8,210
Ornamentals	137	476	1	30	505	-----	-----	1,690
TOTALS	322	16,644	295	906	17,255	15,358	1,392	9,900

3. Seed Transfers to the National Seed Storage Laboratory

No seed was sent in 1971. However, increases of several tomato, cucumber and corn varieties were made at the Regional Station for the National Seed Storage Laboratory to replenish their supply of seed which was getting low in germination.

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

a. Ornamental Evaluation Program.

1. Regional Station Trial

342925 - Alnus pendula. Japan. Plants failed to overwinter.

316616 - Cornus controversa. Korea. Plants here have relatively very few leaves.

323959 - Cornus alba. Siberia. Plants failed to overwinter.

325250 - Cornus sanguinea. Caucasus, Crimea. Differences in bark color noted.

325254 - Cornus walteri. China. A late (mid-June) flowering introduction.

269293 - Cotoneaster dammeri 'Skogsholmen'. Borderline hardy here. Branches on ground flower while those above are killed.

325271 - Cotoneaster microphylla. Hardy herbarium specimens taken for re-identification.

309681 - Cotoneaster obscura. Italy. Sprouts from base - 3' stems dead.

316967 - Forsythia ovata. Korea. Flower buds lack hardiness here.

324986 - Hypericum sp. Taiwan. Failed to overwinter.

38807 - Ligustrum quihoui. China. Accession failed to overwinter.

325361 - Ligustrum vulgare. Stavropol region. U.S.S.R. Apparently hardy, potentially good hedging plants in this accession.

323718 - Lonicera involucrata. Hanna, Utah. Hardy, flowers, fruits and foliage is clean and lasts all season.

303579 - Rosa sp. Colorado. Early (mid-May) flowers.

2. Distribution of Plants to Regional Trial Cooperators Table II shows 14 items totalling 1,359 plants in addition to miscellaneous introductions of 290 plants were shipped from the Regional Station. Of the 14 items offered to regional trial cooperators, nine species (4 trees, 4 shrubs, and 1 grass) were vegetatively propagated. This leaves three trees, one shrub, and a perennial forb species available as seedlings. Three of the 14 trial species are from the Nebraska-Viehmeyer collections.

5. Domestic Exploration

See page 3 of the main report.

6. New Crops Program

Evaluation of new crops for potential industrial utilization was continued in 1971. Several accessions were grown for the first time. In a pollination study in Indiana, using gene markers, it was found that Crambe is highly self-pollinated. From the standpoint of making seed increases, this will be of considerable help to us because we can now grow them in adjacent rows without having considerable cross pollination taking place.

7. Public Relations

The Regional Station hosted about 100 people in 1971. They represented private interests, state and federal agencies, foreign visitors and student classes. Some of the larger groups are listed below:

Montana Agronomy Club	15
Agricultural Extension Directors	25
Teachers from Springbrook Conservation Camp	35

SUPPLEMENT I
To
NC-7 Annual Report for 1971

1971 PLANT PATHOLOGY REPORT

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

I. Disease Screening:

A. Corn - another 310 lines were screened in the field for stalk rot, rust, and smut. Northern corn leaf blight was very light this year so no data were taken on this disease.

1. Stalk Rot: Corn stalks were inoculated with Diplodia zeae in the second internode above ground 2 weeks after 50% tasselling. First tasselling date was June 23, first inoculation date was July 8. Tasselling data were taken every week and inoculations made two weeks later till inoculation number 7 on August 18. One month after inoculation the stalks were split and readings were taken on the percentage of the inoculated internode that had rotted. There were 4 replicates of 10 plants each in a randomized complete block design. Five check lines were used: B37Tms x B14A, C103TRf x B14ATRf, A239 x B14ATRf, AES704, and IA4417A. These will be referred to as check 1, check 2, check 3, check 4, and check 5, respectively.

Of 310 accessions tested this year, 19 showed less than 75% of the inoculated internode rotted one month after inoculation. These were: 257624 (74%), 262477 (73%), 262484 (72%), 262494 (72%), 262495 (69%), 262588 (68%), 267203 (74%), 269744 (74%), 269751 (70%), 270080 (73%), 270289 (74%), 270290 (64%), 273474 (72%), 274011 (68%), 276376 (74%), 278708 (68%), 278712 (69%), 278721 (71%), 279022 (69%), and check 1 (70%), and check 5 (74%).

2. Rust: Observations were made on the same plants used in the stalk rot test. Natural infection was the only source of P. sorghi in these plots. Eight PI lines (260614, 266970, 269745, 274009, 274012, 278713, 278722, and 291018) showed no rust in 2 reps whereas checks 1 and 2 showed none in all 4 reps. PI 274012 showed no rust in 3 of the 4 reps. Fourteen other PI lines showed no rust in 1 rep, moderate rust in the other 3.

3. Smut: Twelve PI lines showed 4, or less, smut galls on the 40 plants of each line. These were: 257632 (4), 261265 (4), 267166 (4), 267167 (0), 267172 (2), 267174 (4), 269747 (4), 270297 (1), 279029 (1), 289772 (4), 289775 (3), and 303890 (4). Checks 1 and 2 each had only 1, check 3 had 4.

Of the 12 PI lines just mentioned it would appear that at least 3 lines (267167, 270297, and 279029) have a degree of smut resistance. Inoculated tests will be necessary to determine what this level of resistance might be.

B. Tomato - another 180 accessions were grown in the field for Rhizoctonia fruit rot evaluation. Immature fruits in the color-break stage of development were harvested from the field plots and utilized in an inoculated laboratory test. A culture of Rhizoctonia was isolated from tomato fruits in the greenhouse and increased on potato dextrose agar. Portable transite benches (30" x 44" x 6") were filled with coarse sand and inoculated with 3 petri dishes of Rhizoctonia per bench by spraying the blended agar culture on the surface of the sand. The immature tomato fruits were partially (2/3 to 3/4) immersed in the sand. Water was sprayed onto the inoculated bench and a plastic cover put over it to prevent drying. Infection was quite high after one week.

Only PI 193407 showed promise of having Rhizoctonia fruit rot resistance in this year's tests.

C. Alfalfa - greenhouse tests are being run on 225 accessions of alfalfa for reaction to northern root knot nematode, Meloidogyne hapla. Using leaves from the same plants, Leptosphaerulina leafspot reaction is also being obtained. Data are being obtained at the present time and will be included in next year's report.

D. Cucumber - 42 accessions previously reported to have some powdery mildew resistance (see: Summary of Reports on the Resistance of Plant Introductions to Diseases, Insects, and Nematodes. Cucumis sativus and Cucumis spp.) were exposed to a heavy epidemic in the greenhouse. Only five (147065, 197085, 197086, 197088, and 288238) showed enough promise of resistance to include in further tests. These lines, along with Ottawa 41 (a single plant selection by V. W. Nuttall from PI 227208 for field resistance to mildew) and PI 227208, were put in a 3 replicate test in the greenhouse in November, 1971. The accessions 147065, 197088, and 288238 had the highest resistance in this test, averaging between 1 and 2 on a 0-5 scale where 5 is most severely diseased. PI 227208 rated only slightly better than the susceptible check Model, as did Ottawa 41. Marketer, the other check, was even more susceptible than Model. Please note that this was a severe greenhouse test and the resistance of Ottawa 41, and perhaps other PI lines, is optimum only under field conditions.

We have not yet been able to differentiate powdery mildew isolates using Cucumis sativus. Using the C. melo cultivars: Hale's Best Jumbo, (H. B. J.), PMR45, and PMR6, however, our isolate would be called muskmelon race 2, based on its virulence on H. B. J. and PMR45.

E. Crambe - inoculation techniques are being worked out in the greenhouse for Alternaria circinans. Preliminary tests indicate that testing can be done under greenhouse conditions with the aid of dew chambers. Plants, approximately 15 cm. tall were inoculated using an artist's airbrush to impregnate the leaf tissue with an Alternaria culture. The plants were then placed in a dew chamber for 48 hours at 22° C. Typical leaf symptoms occur within 2 weeks. Symptoms have not yet been produced on seed pods either using young plants or plants in flower.

II. Seed Borne Pathogens:

A. Sunflower - downy mildew was found on several plants in this year's seed increase planting. Diseased plants were destroyed. D. E. Zimmer, Fargo, indicated to me that whenever sunflowers are planted on land on which sunflowers had been grown in the preceding year or two, much higher levels of downy mildew infection will occur. This is borne out by our experience this year since sunflowers had been grown on this year's plot only two years ago. Using lines which have shown high percentages of mildew infection in the past, I hope to determine next summer just how important seed borne inoculum is to the epidemiology of sunflower downy mildew.

B. Scorpiurus - the bacterial pathogen which is seed borne in this legume is still unidentified. Two isolates obtained from infected seed, one forming yellow colonies, the other cream, appear to be poor pathogens, if they are pathogenic at all. Healthy plants for inoculation purposes have been difficult to obtain.

C. Cucubita - virus-line symptoms on Cucurbita accessions were observed in the greenhouse on plants to be transplanted into the field for seed increase. Attempts to transfer a pathogenic agent to indicator plants were unsuccessful. The disease-like symptoms receded as the plants grew larger, so they were moved out to the field plots. No higher level of virus infectfon was noted throughout the growing season than has been normal.

D. Ergot - tests are continuing on longevity of sclerotia under our seed storage conditions. Several genera of grasses have produced ergot sclerotia which are still viable after 13 years in cold storage. This has never, to my knowledge, been reported

before. It has been assumed by most researchers that these sclerotia are relatively short-lived, usually surviving for only one season. Hopes of merely holding ergot contaminated seed for a couple of years to get rid of viable sclerotia now seem unlikely.

III. Records of Plant Diseases in the Field, 1971:

A hot June prevented many leaf diseases from becoming established early enough to reach important levels in our plots. Smut was more severe than usual in the corn but northern and southern leaf blights were practically non-existent. Rust became heavy on susceptible corn lines late in the year. Sunflower and alfalfa rusts were also quite severe by late summer. Powdery mildew was heavy on sunflowers, also.

Early blight was again severe in the tomatoes and Septoria also showed up in varying amounts late in the season. The hot June weather prevented an early fruit set but cool weather the rest of the summer premitted an unusually heavy set of mid-season blooms. Dry conditions kept fruit rots to a very low level throughout the year.

Ergot was again common in many grasses but not as severe as two years ago.

IV. Work Planned for Next Year:

A. Corn stalk rot screening will continue, with this year's test completing the corn collection. Smut and rust will also be observed in the disease screening plots.

B. Rhizoctonia fruit rot tests will be continued on approximately 350 accessions using the sand bench technique reported on this year.

C. Alfalfa will be screened for root knot nematode resistance in the greenhouse. Lines which have not already been evaluated for Leptosphaerulina leaf spot will also be inoculated with this organism.

D. Cucumber - attempts are being made to more critically evaluate the powdery mildew resistance of the better Cucumis material. This includes utilizing disease index figures derived from spore production counts, tolerance to infection, and length of time from one spore cycle to the next.

E. Crambe will be screened for resistance to the leaf and pod phases of the Alternaria disease, as soon as dependable screening techniques are worked out.

F. Cucurbita seedlings will again be observed in the greenhouse for possible seed-borne viruses before being planted in the field.

G. Sunflowers will be observed for downy mildew in the seed increase plots, again. Diseased plants will be destroyed. In addition, I hope to be able to clear up some of the doubt concerning the importance of contaminated seed in the epidemiology of sunflower downy mildew. Seed from known susceptible lines will be planted: in soil not known to have had sunflowers on it, in soil one year from sunflowers being on it, in soil two years from sunflowers, and three years. Where possible, seed from contaminated stocks will be used.

H. Take notes on unusual disease occurrences in our plots and watch plantings from original seed for unknown pathogens.

SUPPLEMENT II
To
NC-7 Annual Report for 1971

1971 ENTOMOLOGY REPORT

North Central Regional Plant Introduction Station
Regional Project NC-7
Ames, Iowa
J. L. Jarvis

Pepper introductions were evaluated in the field for resistance to larvae of the European corn borer. Pimiento, bell, and paprika peppers were susceptible; chili, cayenne, tabasco, and ornamental peppers were resistant. The most important factor influencing resistance to the borer appears to be pungency. All sweet peppers tested were susceptible, pungent peppers moderately resistant, and very pungent peppers highly resistant.

When the pungent principle in peppers, capsaicin, was incorporated into a mederic diet and fed to newly hatched European corn borer larvae, survival was greatly reduced by concentrations of capsaicin as low as 0.062%.

Peppers were screened in the greenhouse for resistance to green peach aphid. All peppers that were evaluated were susceptible.

Corn introductions were screened in the field for resistance to 2nd generation larvae of the European corn borer. PI 222612 and PI 222643, both from Kansas, show promise as sources of resistance. Both had fewer shank cavities than the inbred line B 52 (the most resistant corn known). These two corn introductions also had a low number of cavities within the stalk. Stalk cavities were considerably smaller than cavities in other introductions, indicating the possibility of a low level of antibiosis type resistance to stalk tunneling.

A potential insect problem was noted in one of the new crops, Helianthus annuus X H. tuberosus. An unidentified lepidopterous larvae was found infesting the tubers. Specimens have been sent to the U.S. National Museum for identification. An attempt will be made to determine the importance of this insect as a potential pest.

Work Planned for Next Year

1. Continue screening corn for resistance to the 2nd generation of the European corn borer. Numerous sources of resistance to the 1st generation are available.

2. Continue screening peppers for resistance to the European corn borer. Only sweet peppers will be evaluated inasmuch as the pungent (hot) peppers have a good level of resistance to the borer owing to the presence of the pungent principle capsaicin.

3. Evaluate a selection of chrysanthemum for resistance to two species of grasshoppers.

4. Determine the biology and economic importance of an unidentified lepidopterous larva (specimens have been submitted for identification) that feeds on the tubers of an interspecific hybrid of Jerusalem artichoke x sunflower.

5. Determine if any potential insect problems may exist on new and experimental crops being grown at the plant introduction farm.

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