ANNUAL REPORT OF COOPERATIVE REGIONAL PROJECTS  
Supported by Allotments of the Regional Research Fund,  
March Act, as Amended August 11, 1955  
January 1 to December 31, 1973

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:  
R. W. Bougas, Wisconsin  
W. H. Skrdla, Iowa

Administrative Adviser:  
W. H. Skrdla, Iowa

Regional Coordinator:  
R. W. Bougas, Wisconsin

State Department Stations and Representatives:  
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North Dakota  *G. A. Peterson  
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North Central Regional Plant Introduction Station Staff, Ames, Iowa:  
Regional Coordinator:  
W. H. Skrdla  
Research Horticulturist:  
A. F. Dodge  
Research Plant Pathologist:  
R. L. Clark  
Research Entomologist:  
J. L. Jarvis

3. PROGRESS OF WORK AND PRINCIPAL ACCOMPLISHMENTS:  
a. Introductions Having Special Value:  
Described below are plant introductions, reported by cooperators in 1973, that 
are considered to have made important contributions to plant breeding programs and to 
U.S. agriculture. Additional reports on these and other plant introductions which 
describe their value in greater detail are provided in Appendix C of this report, titled 
"Promising Plant Introductions for 1972".

(1) Alfalfa  
*(a) PI 141462 from Iran contributed stem nematode resistance to the variety 
WL 450 released in 1972.  
*(b) Five alfalfa introductions contributed to the germplasm release, 5-An2.  
(2) Conyza canadensis (annual)  
PI 251390 from Iran was released as the variety 'Robbin' by the Minnesota 
ARS on April 1, 1973. This introduction consistently outyielded the 'Minn-Dak' check 
variety in trials at Rosemount and Robbin, Minnesota. 'Minn-Dak' was superior to other 
commercial sources in the U.S. and to most foreign introductions.

(3) Maize:  
Two corn introductions, PI's 217407, 'Ladyfinger Pop' and 221871, 'Delta 
Prolific White' were found to be resistant to Yellow Leaf Blight, Phyllosticta zeae at 
the Wisconsin ARS.
New agronomic, horticultural and industrial plant introductions received in 1973 totaled about 550, including ornamentals. For seed increase and revitalization, more than 2,900 accessions were grown, including 700-800 perennial accessions carried over from 1971. Special purpose plantings (750 accessions) included 127 corn accessions for corn borer resistance screening, 325 tomatoes for fruit rot resistance, 150 corn for rust and stalk rot resistance, and 148 peppers for European corn borer resistance. Plant material distributed amounted to more than 12,000 items (estimated) of seed packets and plants.

The quarantine on corn from several parts of the world, including the Philippines, Thailand, Africa, etc., materially reduced the number of incoming corn introductions. This will continue until procedures are developed at some location to increase corn under strict quarantine conditions. We are not equipped for this at our Regional Station except in a very limited way, like two or three accessions per winter season.
(3) Improvements and repairs were made to certain facilities at the Plant Introduction Farm. One of the more important improvements was that of lowering the relative humidity in the seed storage room. By means of reducing the speed of the unit cooler fans and providing extra heat by means of 12 200-watt light bulbs in the ceiling, we succeeded in lowering the RH from an average of 70-75% to 40-45%. During the winter, the RH is 40% or less.

(4) The interior of the farm greenhouse was lined with plastic to provide insulation. The reasons are twofold: (1) to help keep the house warmer during cold spells in the winter and (2) to save fuel. Both objectives are being accomplished.

(5) Plant introductions were evaluated in the field and greenhouse for disease and insect resistance:

(a) Disease screening: Another 325 lines of tomatoes were evaluated for Rhizoctonia soil rot of fruits. Mature fruits were collected from the field for exposure to infection in sand benches.

Three lines, PI's 193407, 205001, and 205004, which showed evidence of resistance in previous tests, were included in this year's test, also.

Lines showing 50% or less, rotted fruits in the first test were subjected to a second, third, and even fourth test, if they continued to stay below 50% rotted fruits. The only lines still showing good resistance after three tests were: PI's 205001, 263589, 270448, 272648, and 272649.

Sixty four corn introductions were planted in a rust nursery. Of these, eight were highly susceptible and acted as inoculum sources in the nursery. The most resistant lines were PI's, 172332, 186191, 186196, 186197, 186209, 186215, 186223, 190081, and 198901. The type of resistance detected in this test was mature plant resistance.

Pseudocercosporella stalk rot evaluations were made on 84 corn introductions previously showing some evidence of resistance. Fifteen accessions showed good resistance.

(b) Disease control and identification: Sunflower downy mildew is still considered one of our more serious seed-borne pests. Control is effected by growing new accessions for three consecutive years, during which time any systemically infected plants are burned. Accessions must show no infected plants for three years before seed is harvested for distribution.

Two introductions of corn and one of Panicum were grown in the greenhouse under post entry quarantine, using supplemental lights. No abnormalities were found in the corn but the Panicum (which also contained Setaria and Echinochloa) will be regrown for observation. Good seed increases were obtained.

(b) Insect resistance screening: A total of 148 pepper introductions were evaluated in the field for resistance to larvae of the European corn borer. Fruits were artificially infested with laboratory produced egg masses. Only sweet peppers were evaluated inasmuch as previous data demonstrated that pungent peppers are resistant to the borer. All sweet peppers evaluated this year were susceptible.

A total of 127 corn introductions were screened in the field for resistance to second generation larvae of the European corn borer. The following eight introductions had fewer stalk cavities than the inbred, B52 (resistant check): PI's 172324, 172327, 172238, 194389, 194791, 195113, 195239, and 195240. However, these introductions should be further evaluated.

Crambe and other cruciferous oilseeds were evaluated for resistance to cabbage looper and imported cabbage worm. All were susceptible.

A technique was developed for successfully rearing armyworms in the laboratory. Preliminary screening of a few corn introductions for armyworm resistance showed some minor differences among accessions but none were resistant.

No insect problems were developed on any new or experimental crops being grown at the Plant Introduction Farm in 1973.
(d) Ornamental plant distribution: Tree and shrub plants distributed to 35 cooperators on request totaled 1,152 plants. In addition, lily bulbs were sent to two cooperators.

Ten 10-year reports on 13 trial items and three 5-year reports on 4 items were prepared.

(3) Ornamentals evaluation: Seed of shrubs and trees from Yugoslavia were stratified and are beginning to germinate. Plants of several herbaceous perennials, largely from Siberia, were planted out for observation and seed production. In addition, Potentilla fruticosa, PI's 369302, 369303, 369307, 369308; and Rosa rugosa, PI 369316, all from Siberia, are being evaluated for dwarfness and other attributes.

About 622 introductions of ornamentals representing 147 genera are on hand as plants or as seed in storage. These include herbaceous annuals and perennials as well as trees and shrubs. Plants of cinquefoil, Rugosa Rose, Daylily and Formosa Lily appear to be unique.

Additional and more detailed information on individual species and introductions appears in Appendix D of this report.

2. Domestic Exploration: Progress during the first year was not as good as expected by the leaders of this work. Reasons are that this is a new endeavor in this area of nut crops work and procedures for this new work had to be established and communicated to all participants. New concepts as to what genetic traits to look for in the tree, as well as nuts, had to be developed. Further, heavy rains during the fall and spring seriously impeded travel and mobility into the collecting areas.

However, workers in Illinois, Iowa and Missouri were able to get into the field for a limited time and make selections. Kansas conducted a survey and labeled selections for further observation. Further explorations are planned in these four states.

3. Regional Cooperative Program: The Ohio Station assisted with the increase and evaluation of another 150 new tomato introductions in 1973. The Nebraska and Indiana Stations continue to evaluate new alfalfa introductions for insect resistance. Other stations in the region are also assisting with this work.

4. USEFULNESS OF FINDINGS:

Plant introductions continue to provide valuable germplasm for plant traits, 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 the exchange and dissemination of information and seed, through the NC-7 project, helps to better serve crops workers. The permanent maintenance and preservation of plant introductions assures a valuable germplasm 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 and evaluation work; (3) check new plant introductions for abnormalities; (4) local and regional testing of new crops and ornamentals; and (5) coordination of regional cooperative program.

b. Assist the Missouri and other stations with domestic exploration for native 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


b. State Station Publications
(1) Nebraska

c. Journal Articles
(1) Illinois
(2) Indiana
(3) Iowa
(4) Kansas
(5) Nebraska
(6) North Dakota
(7) **Ohio**
   (8) **Wisconsin**
   (9) **USDA, Beltsville**

7. APPROVED:

   Date: June 22, 1974

   Chairman, Technical Committee
   K. J. Lessman

   Date: 1/31/74

   Regional Administrative Adviser
   R. W. Hougas
MISCELLANEOUS PUBLICATIONS

1. Printed Publications

The publications listed below are from other regions and foreign sources but concern NC-7 primary maintenance crops.

a. Barley


b. Crambe


c. Alfalfa


d. Tomatoes

