North Dakota State University * Dickinson Research Extension Center
1133 State Avenue, Dickinson, ND 58601 Voice: (701) 483-2348 FAX: (701) 483-2005

REPORT OF AGRONOMIC INVESTIGATIONS - 1959

BY THOMAS J. CONLON

The Season of 1959

The growing season of 1959 was characterized by above ground average temperatures and lack of adequate moisture to produce high yields under the temperature conditions that prevailed. The summary of precipitation for the year shows a deficit of three inches for the growing season. Shortage of rainfall and high temperatures combined to reduce potential crop yields.

Table 1. Daily Precipitation

Table 2. Climatic Data Summary

Crop Rotation and Tillage Studies

In southwestern North Dakota, the tillage method and cropping history of the land during the previous year have a most important effect on crop production. Crop yields in this area are dependent upon the moisture provided by seasonal rainfall plus the moisture which is stored in the soil at seeding time, and any farming practice that will aid in holding and storing moisture in the soil and which will make maximum use of that moisture for crop production is recommended practice for this area.

In recent years the recognition of the importance of the use of commercial fertilizer on some crops has resulted in the inclusion of several trials designed to study the effects of commercial fertilizer on crop production when used along with different crop rotations and tillage methods.

In these experiments tillage in preparation for seeding usually is begun within two or three days of the earliest work on farms in the community. The average seeding date is about the middle of April. Average harvest time is the first week in August.

Grain yields in these experiments are no better than yields harvested on the better farms in the area and for the most part reflect fairly well the approximate annual yields for this area.

Use of commercial fertilizer in a two year corn-wheat rotation.

In 1955, a series of two year corn-wheat rotations were planned to determine the effects of different methods of commercial fertilizer application in such a rotation on crop yield, and to determine the residual accumulation, if any, of commercial fertilizer applied to the land annually.

Initial soil tests made in 1955 indicated the need for a drill application of 75 pounds of ammonium phosphate (11-48-0) on the wheat and 100 pounds of ammonium phosphate (8-32-0) on the corn in these trials.

Yields from this years trial are presented in tables 3 and 4. Average yields for the five year period 1955-59 are summarized in tables 5 and 6.

Differences in wheat yields on fertilized and unfertilized cornland have varied from a low of 2 bushel per acre this year to 10.6 bushel per acre in 1955, which is the greatest difference in yield occurring in the five year period. Average difference between wheat yields on fertilized and unfertilized cornland is 3.5 bushels per acre in favor of fertilizer.

Tables 3 - 6

Table 3. Wheat yields - Corn-wheat rotation fertilizer series

Table 4. Silage yields - Corn-wheat rotation fertilizer series

Table 5. Wheat yields, corn-wheat rotation fertilizer series

Table 6. Silage yields, corn-wheat rotation fertilizer series

Comparison of wheat yields on continuous cropping, cornland and fallow, fertilized and unfertilized.

This is one of the newer trials, set up on the old DLA rotation field, to compare long time results from commercial fertilizer application under three different cropping systems. Yields this year are the first ones recorded in this experiment.

Fertilizer application on non-fallow land is 25 pounds N and 36 pounds P^2O^5 per acre. On fallow land the rate of application is 8 pounds N and 36 pounds P^2O^5 per acre.

Yields from this years' trial are summarized in Table 7. It is interesting to note that application of fertilizer increased yields under all three

cropping systems by approximately the same amount.

Table 7. Wheat yields on continuous cropping, cornland and fallow, fertilized and unfertilized.

Wheat-sorghum, wheat-corn, and wheat-sudan compared in a two-year rotation.

Rancher forage sorghum, Reliance grain sorghum, Piper sudan grass and Nodakhybrid 301 corn are compared as silage crops in this trial. In years when grain sorghum matures, seed yields of this crop and shelled corn yields will also be recorded.

Growing conditions were poor for all these crops this year, and only yields of silage were obtained.

Yields from this years' planting are summarized in Table 8.

Wheat-soybeans in a two year rotation.

Wheat following soybeans produced an average yield of 11.2 bushels per acre in 1959.

The soybean crop was a total failure again this year, making the third consecutive year of failure for this crop in the Dickinson trials.

Different methods of planting corn.

This new trial is designed to compare 38 inch, 42 inch, and 42 inch wheel track planting of corn. This is the first year yields have been recorded from this experiment.

Corn silage yields were highest in the 38 inch row spacing and lowest in the wheel track planting this year, but actual differences are not very large.

Results for several years will be necessary to determine whether or not there is an advantage for any one method.

Table 9. Yields in the methods of planting corn trial.

Covering the trench silo with plastic sheeting at the Dickinson Experiment Station livestock farm. Corn silage was a basic part of most of the rations for cattle and its use was promoted by the station. Trench silos were also both used and promoted by the station as the most economical and most efficient method of sotring silage in western ND.

Yields on continuously cropped land compared with yields from alternate crop and fallow.

The continuous cropping series of plots set up in 1908, have been continued without interruption for fifty three years.

Yields from this years' trial and average yields for the fifty-three year period, 1908-1959 are summarized in Table 10.

This experiment has shown spring plowing to be a better tillage method for this area than fall plowing. When spring plowing is practiced the grain stubble is left standing during the winter months to catch and hold snow which helps provide moisture for germination and early growth of the crop in the spring. This is perhaps one of the biggest reasons for differences in production from these two tillage methods.

Local spots of gumbo or heavy clay soil and small areas of river bottom land that dry out slowly in the spring are the exceptions that may require fall plowing in western North Dakota.

At the present time continuous cropping of small grain is neither recommended or practiced to any extent in this area. Alternate cropping and fallow is a common practice over much of this region, but in the past few years this practice has been replaced by many farmers with

a corn-grain rotation which is a more productive cropping sequence if the corn crop is utilized as silage.

Comparison of yields on stubble land tilled in the spring with the moldboard plow, the one-way disk and the double disk.

An experiment comparing the moldboard plow and the double disk for the preparation of stubble land to be seeded to small grain was begun in 1924 and discontinued in 1957. Yields during this 34 year period clearly showed spring plowing to be the better tillage method. Yields from spring plowing averaged 3.5 bushels per acre more for the entire period and were higher than yields from disked stubble in 26 of the 34 years. There were three crop failures for both methods, yields were equal four years, and yields from disked stubble were slightly higher than from spring plowed stubble in only two years, 1931 and 1937. In both of these years yields were so low that for all practical purposes they could also be considered crop failures.

In 1955, another trial was begun to compare the yields on stubble land tilled in the spring with the one-way disk, the moldboard plow and the double disk. Yields from this trial are summarized in Tables 11 and 12. These results show that spring plowing with a moldboard plow is the best method of tilling stubble land to be seeded to small grain in western North Dakota. Double disking is the poorest tillage method with one-way disking being intermediate between double disking and spring plowing.

Corn and wheat in a two-year rotation compared with oats - peas and wheat in a two-year rotation for the production of silage and cash grain.

This trial was begun in 1957 and a summary of yields for the three year period 1957-1959 are given in the following tables.

Table 13. Silage yields from the oats-peas and wheat vs corn and wheat rotations.

Table 14. Wheat yields from the oats - peas and wheat vs corn and wheat rotations.

One of the points often overlooked in comparing oats - peas and corn as silage crops is the yield of the crop on this land the year following silage production. Results from this trial and past experience with other trials would indicate that the best second crop yields would be expected following corn. In this trial, wheat after corn has consistently outyielded wheat after oats - peas, the average difference for the three years being 4.7 bushels per acre.

Annual cool season forage production trial - 1959.

The yields obtained in the annual cool season forage planting for 1959 are given in Table 15. Seed for this trial was supplied by Dr. J.F.

Carter, and the trial was grown at several other branch stations and also at Fargo. At Dickinson the trial was grown on land summer fallowed in 1958, and also on wheat stubble land. Yields in Table 15 are from the stubble planting. The fallow planting was considered a failure and was not harvested, because of the lack of moisture growth of all crops had stopped and all plots on the stubble planting were cut on July 21. Vetch and peas were handicapped by the dry weather. Percentage of vetch and peas in the oats-vetch and oats-peas mixtures was very low. Excellent fall moisture resulted in an estimated 500 lbs. per acre regrowth on the vetch plots. No regrowth of any consequence was observed on the vetch - oats plots.

Spring moisture and yields on standing stubble land vs spring moisture and yields on stubble land tilled in the fall.

Crops in this region are dependent upon the moisture provided by seasonal rainfall plus the moisture which is stored in the soil at seeding time. Therefore, it is important that we use only those tillage practices that will conserve soil moisture. A fairly common practice in this area is fall tillage of stubble with the one-way disk. On localized spots of heavy clay or gumbo soils some fall tillage may be needed, but on the sandy and loamy soils, the predominant soils found in the southwestern North Dakota, fall tillage of stubble land may be unnecessary.

In 1957 determinations of soil moisture at seeding time at 6 inches to a depth of 2 feet on stubble land tilled in the fall with the one-way disk were compared with moisture on land where the stubble had been left standing undisturbed over the winter. In this comparison soil moisture was found to be significantly greater at all intervals under standing stubble in the following amounts: at 0-6 inches, 16.1%; 6-12 inches, 44.4%; 12-18 inches, 56.0%; and 18-24 inches, 12.8%. The soil was dry at seeding time below the 24 inch depth.

In the fall of 1957 tillage with a 5 foot sweep was added to the trial. It had been suggested that tillage with sweeps leaves the stubble comparatively undisturbed but leaves the soil loose to permit better penetration of fall, winter and spring moisture with less run off.

Dat from this trial for 1958 and 1959 summarized and analyzed shows no significant differences between these treatments at the 5% level of significance for soil moisture at 6 inch intervals to a depth of 36 inches or for yield of wheat for either year.

Stubble Mulch Trial

Stubble mulching is a year-round system of land management in which all mechanical operations are performed in ways which preserve much of the stubble and other vegetative material on or near the surface of the soil to protect the soil from wind and water erosion, to prevent soil compaction and crusting and to increase water intake and reduce run off.

Good summer fallowing includes adequate protection of the soil against erosion during the fallow period, and also includes protection of the seedbed after the crop has been seeded. Properly managed stubble mulching accomplishes both objectives.

Specifications for the minimum amount of small grain residue required to control erosion have been established by the Soil Conservation Service. These specifications are given in table 16. Primary emphasis on stubble mulch fallowing in western North Dakota in many, if not in most years, will be toward the conservation of the maximum amount of trash present on the land because on years of moderate to low yields the amount of trash available after harvest may be barely adequate to provide the minimum amount of residue required to control erosion. However, some consideration should also be given to years when high yields provide a heavy and excessive amount of trash. In such cases consideration should be given in the fallowing operation to the reduction of surface trash, not to a point below the minimum amount required to control erosion, but to a point which can be satisfactorily handled by the seeding implements and methods used.

Table 16. Minimum amount of small grain residue required to control erosion

Table 17 shows the percentage of residue conserved after each operation on stubble mulch fallow with several different tillage implements.

A stubble mulch fallow trial was begun in1958 to study and compare the amount of straw and trashy residue that can be saved at or near the surface of the soil by various summer fallow tillage methods, and its effect on crop yield, soil tilth and erosion control.

A plot layout on Field N, Section 4-139-96 was selected for this work and half of the selected layout was uniformly cropped to wheat and half was uniformly fallowed in 1957. First tillage of fallow in 1957 was with the moldboard plow, and all subsequent tillage on the fallow plots that year was with the duckfoot cultivator equipped with 10" sweeps. The wheat crop of 1957 left an average of 2680 pounds of stubble and straw on the land. Fallowing operations begun on this land in 1958 compared five different tillage implements. They were: the moldboard plow, the one-way disk, duckfoot cultivator equipped with 10 inch shovels, cultivator equipped with 24 inch shovels and a wide sweep equipped with a 5 foot straight blade. Three separate tillage operations were necessary to control weeds in 1958. Average amounts of residue on these plots at seeding time in the spring of 1959 were: for the 5 foot blade, 1800 lbs.; for the 24 inch sweep, 1100 lbs.; for the 10 inch sweeps, 900 lbs.; for the one-way disk, 350 lbs.; and for the moldboard plow, 200 lbs. Yields recorded in 1959 on these plots are given in Table 18.

In 1958 the plots uniformly fallowed in 1957 were seeded to wheat and produced an average yield of 34.6 bushels per acre, leaving and average of 3400 pounds of stubble and straw on the land. In the 1959 trial an implement known as the Victory blade, equipped with 4 foot V-type sweeps was used instead of the 5 foot straight blade and the 24 inch sweep was not used. Average amounts of residue remaining on these plots in the fall of 1959 were: for the wide sweep, 2500 lbs; for the 10 inch shovel, 800 lbs.; for the one-way disk 700 lbs.; and for the moldboard plow 250 lbs. Table 19 summarizes the data on cloddiness, residue, roughness and the natural wind erodibiblity index as calculated by SCS methods.

Table 19. Summary of relative effectiveness of various tillage treatments for controlling wind erosion on sandy loam soil

Photo: Stubble mulch fallow plot showing 2700 pounds of residue per acre after two operations with the Noble blade. The 1958 wheat crop yield was 34.0 bushels per acre. There wad 3400 pounds of residue on the land before tillage.

Photo by Don Broberg, SCS

Wild Oats Control Work - 1959

Spray applications of endothal, sinox and isopropyl-n-phenyl carbamate were made in the fall of 1958 on observation plots infested with a heavy stand of wild oats. These plots showed no appreciable reduction in wild oat stand from the application of either the endothal or the sinox spray. There was, however, a marked reduction in the stand of wild oats on the plot sprayed with IPC. Additional work with IPC is planned for 1960.

Spray applications of 1/4 lb., ½ lb., 1 lb. and 2 lbs. per acre of S847 were made in the spring of 1959 on observation plots infested with a heavy stand of wild oats. Seedings of wheat, oats and barley were made across these plots earlier in the spring to permit observation of the effect of the chemical on these crops at the different rates of application. The effects of the extremely droughty season made

observation of minor differences difficult but fair control of wild oats was effected with the 1 and 2 lb. rates. No crop was considered worth harvesting in this trial. Work will probably be continued with this chemical in 1960 if it is not discontinued for reasons not known at the present time.

Work with M-757 was discontinued because the developing company has discontinued it as a potential wild oats control chemical.

Experiments with Corn - 1959

The corn maturity rating trial and the roughage production trial with corn were conducted at the Dickinson station this year in addition to the corn included in the rotation, tillage and fertilizer trials which has already been reported.

Because of the poor condition for growth of corn which prevailed in 1959 no differences were apparent in the corn maturity rating trial. All entries stopped growing and began to dry up the third week in August. The trial was not harvested.

Data from the Roughage production trial is summarized in Table 20. Silage production, green weight calculated at 70% moisture ranged from 1.89 tons to 3.03 tons per acre in this trial with the average yield for the entire trial being 2.46 tons per acre.

Experiments with Barley - 1959

Experiments with barley in 1959 included field plot trials with 15 varieties and the Great Plains nursery planting of 17 entries.

Field plot trials

Yields from the field plot trials are summarized in Tables 21 and 22. Exceptionally good yields were obtained in this years' field plot trials. Highest average yield was produced by Titan, 35.9 bushels per acre with Tregal, Liberty, Traill, Betzes and Hannchen all yielding over 30.0 bushels per acre.

Nursery trial

Yields here were considerably lower than those in the field plots. Piroline, Korol and a Vantage-Compana cross, No. 5401-42, were high yielders at 19.0 plus bushels per acre. Yields from the Great Plains Nursery planting are summarized in Table 23.

Experiments with flax - 1959

Experiments with flax at the Dickinson station in 1959 included a varietal field plot trial of 10 varieties and the Uniform Regional Flax nursery planting. In addition, flax was included in the field plot trial with safflower for purposes of comparison.

Field plot trials

Lack of adequate moisture and excessively hot weather damaged the field plots so severely that they were considered a total failure and were not harvested.

Nursery trials

Yields in the nursery trial with flax ranged from 3.9 bushels to 6.1 bushels per acre. Data from the Uniform nursery planting are summarized in Table 24.

Experiments with Oats - 1959

Experiments with oats in 1959 included a field plot trial of 13 varieties and the North Central Uniform Oat Nursery planting of 29 varieties and selections.

Field plot trials

Highest yielders in this years field plot trial were Vicar hulless, Rodney, Sauk Garry selection, Gopher and Mo-o-205, all producing above 35.0 bushels per acre. Compared with barley, oats was the poorer crop by a wide margin this year. The highest yielding barley variety, Titan, yielded 1759 pounds of grain per acre compared with 1274 pounds of oats per acre from the highest yielding oats variety. Yields from the 1959 oats field plot trial are summarized in Table 25.

Nursery trials

Test weights were light and yields were low throughout in this years North Central Uniform Oat Nursery planting. Data for the trial are summarized in Tables 26 and 27.

Experiments with Winter Rye - 1959

In 1959 four varieties of winter rye grown in field plots yielded well despite poor growing conditions. All four varieties, Antelope, Caribou, Pierre, and Dakold were equal in yield performance this year.

Data on this years Rye variety trial are summarized in Table 28. Yield comparisons for the period 1954-1959 are given in Table 29.

Experiments with Safflower - 1959

Two safflower experiments were grown at Dickinson in 1959. One, a field plot comparison of the safflower varieties Pacific No 1 and Nebraska 10, and B5128 flax is summarized in Table 30. No difference in yield was recorded for the safflower varieties. Flax was slightly higher yielding that the safflower in this trial. The other safflower trial, a Regional nursery planting of nine varieties and selections, produced only fair yields. Highest safflower yield in this trial was 299 lbs. per acre which is appreciably lower than the 342 lbs. per acre produced by the high yielding flax varieties grown in the adjacent Regional Flax nursery. Data from the Regional Safflower nursery planting for 1959 are summarized in Table 31.

Winter Wheat - 1959

Winter wheats included in the Northern Regional Performance Nursery in 1959 are listed in Table 32. The 1959 winter wheat plantings were a total failure, due in large measure to the lack of adequate rainfall for germination and early growth in the fall of 1958.

Experiments with Spring Wheat - 1959

Experiments with spring wheat in 1959 included field plot trials with 19 hard spring wheat and durum varieties, the Uniform Regional Spring wheat Nursery, the Uniform Bunt nursery, the Advanced Station Nursery and early generation nurseries of numerous Dickinson selections.

Field plot trials

Yields from the 1959 field plot trial with wheat are given in Table 33. Production was good despite unfavorable growing conditions, but test weights were on the low side. No significant difference was found between Conley and Selkirk, the two low yielding hard spring wheats, but Lee produced a significantly higher yield than either Conley or Selkirk. Comparative yields in the hard spring wheat trial for the period 1954-

1959 are summarized in Table 34.

In the durum trial Ld389 was high yielder with 17.7 bushels per acre this year. Ld392 produced a very satisfactory yield of 15.5 bushels per acre. Both of these selections have done well in the two years they have been included in Dickinson trials. Table 35 and Table 36 summarize the data from the durum wheat trials.

Nursery trials

Both yields and test weights were low in the Regional nursery planting this year. High yields were produced by Il-44-29 x Lee cross and by several selections from Il-44-29 x Lee^3. Data from the Uniform Regional nursery planting at Dickinson are given in Table 37.

Data from the 1959 Uniform Bunt Nursery are summarized in Table 38, Table 39, and Table 40.

Yields in the Advanced Station Wheat Nursery planting at Dickinson averaged higher than yields in the Uniform Regional planting for the most part, and all entries in the Advanced trial were equal to or better than Lee, Selkirk and Conley, the standard check varieties used. A summary of Fargo and Casselton yields in Table 41 also shows very acceptable yielding capacity for many of these selections. Milling and baking trials for 1959 on Fargo samples were very disappointing, showing practically no promise for any of these high yielding selections. Milling and baking data are given in Table 42.

These plots were seeded in 1953 and most of the stands are still in excellent condition, although a few of the stands show some deterioration, particularly the plots of Canadian commercial.

The average production of all brome varieties this year was 823 lbs. per acre, which is about 57 percent of the average production of the older intermediate wheatgrass plots (Table 2). Bin 12, a southern type brome, was top producer this year with a yield of 1007 lbs. per acre. Elsberry at 952 lbs. per acre, Martin at 951 lbs., and Lincoln at 906 lbs. were next in order. In general the southern bromes continued to show somewhat greater productivity than the northern types. However differences between the two types of strains were not as pronounced this year as they have been in some of the past years. The entire range in yield was only from 704 lbs. for Kuhl to 1007 lbs. per acre for Bin 12.

On the basis of the 5-year average yields Lincoln has a slight advantage in overall productivity, followed closely by Fischer. The rest of the southern type strains show an average yield between 1174 lbs. per acre and 1282 lbs. per acre. The northern type strains show lower average yields, ranging from Mandan 404 at 1156 lbs. Homesteader at 1148, and Manchar at 1145, to Canadian commercial at1040 lbs. per acre. With the exception of Canadian commercial there is practically no difference in yield between the northern type strains.

New Intermediate Wheatgrass Plots. A new intermediate wheatgrass trial seeded in 1958 was harvested for hay for the first time in the 1959 season. This new trial includes 9 varieties of intermediate wheatgrass. Hay yields of the varieties are given in Table 4. The range in

yields in the 1959 season was from 1282 lbs. of dry material per acre for South Dakota 20 to 860 lbs. per acre for A-12496.

The average yield of all varieties was 1143 lbs. per acre, which compares with1439 lbs. per acre average yield from the plots seeded in 1954 (Table 1). Apparently these newly seeded stands have not yet reached their maximum production potential.

Good stands were obtained in these seedings for the most part. However, the plots of A-12496 were considered to be poor and thin as compared to the others. Apparently the seed of this variety was low in viability. The relatively low yield of this variety is a reflection of the poor stands obtained.

New Crested Wheatgrass Plots. Yields of hay (oven-dry weight) from the plots in the new crested wheatgrass trial are given in Table 5. This trial was seeded in 1958, and the first hay yields taken in the 1959 season. Good to excellent stands were obtained with all the crested wheatgrass varieties except Turkish Fairway and A-1770 Fairway. On some of the plots of Turkish stands were only fair, and all stands of the A-1770 were failures. It would appear that these poor stands and failures were due to poor quality seed.

Dickinson spring wheat selections

Approximately 375 selections from hard spring wheat crosses made at the Dickinson Station were grown out in F-1 to F-6 generation nurseries in 1959. Most of the selections in the F-5 and F-6 nurseries have shown promise agronomically and are being advanced to yield tests as rapidly as possible. Selection in the lower generation nurseries is continuing.

SCIENTIFIC CONFERENCES:

Annual Branch Station Conference - NDAC - January 5-9

Regional Spring Wheat Conference - NDAC - January 22-24

CORRESPONDENCE:

Eighty seven letters concerning Station work have been written since January 1, 1959.

PUBLIC MEETINGS

NEWS ARTICLES

June 8, 1959 - Crops Field Day scheduled for June 24 at Dickinson Experiment Station.

RESEARCH ABSTRACTS

AGRONOMIC INVESTIGATIONS

Crops Rotation, Tillage & Fertilizer Studies

Use of commercial fertilizer in a two year corn-wheat rotation: Differences in wheat yields on fertilized and unfertilized cornland have varied from a low of 2 bushels per acre in 1959 to a high of 10.6 bushels per acre in 1955. Average difference in wheat yield for the 5 year period 1955-59 is 3.5 bushels per acre in favor of fertilizer.

Wheat-soybeans in a two year rotation: Wheat following soybeans produced an average yield of 11.2 bushels per acre in 1959. The soybean crop was a total failure again this year, making the third consecutive year of failure for this crop in the Dickinson trials.

Continuous cropping vs. alternate crop-fallow: At the present time continuous cropping of small grain is neither recommended or practiced to any extent in this area. Alternate cropping and summer fallow is a common practice over much of the region, but in the past few years this practice has been replaced by many farmers with a corn-grain rotation which is a more productive cropping sequence if the corn crop is utilized as silage.

Comparison of yields on stubble land tilled in the spring with the moldboard plow, the one-way disk and the double disk: Results from this trial show that spring plowing with the moldboard plow is the best method of tilling stubble land to be seeded to small grain in western North Dakota. Double disking is the poorest tillage method with one-way disking being intermediate between double disking and spring plowing.

Experiments with corn: Silage production, green weight at 70% moisture ranged from 1.9 to 3.0 tons per acre this year. Average yield of corn for silage this year was 2.5 tons per acre, an excellent yield considering growing conditions.

Experiments with Barley: Exceptionally good yields were obtained in this years' trials. Highest average yield was produced by Titan; 35.9 bushels per acre.

Experiments with flax: Lack of adequate moisture and excessively hot weather damaged the field plots so severely that they were considered a total failure and were not harvested.

Experiments with oats: Oat yields were poor by comparison with other small grains this year. Highest yielding oat varieties in this years

trial were Vicar hulless, Rodney, Sauk, Garry selection, Gopher and Mo 0-205, all producing above 35.0 bushels per acre.

Experiments with rye: In 1959 four varieties of winter rye grown in field plots yielded well despite poor growing conditions. All four varieties, Antelope, Caribou, Pierre and Dakold were equal in yield this year.

Experiments with Safflower: Highest safflower yield recorded was 300 pounds per acre. Flax grown under comparable conditions produced 342 pounds of seed per acre.

Experiments with Winter wheat: The 1959 winter wheat planting was a total failure, due in large measure to lack of adequate moisture for germination and early growth in the fall of 1958.

Experiments with Spring wheat: Production in all spring wheat trials was good despite unfavorable growing conditions. Highest yielding HRS variety was Marquis at 16.2 bushels per acre. Wells and Lakota, two new North Dakota durums were high in yields in the durum trial producing 17.7 and 15.5 bushels per acre.

Trials not abstracted are new trials which have not been conducted for a long enough period to allow for conclusions.

Latest Killing Frost in Spring			Earliest Killing Frost in Fall		
1915	June 16	30°F	1917	Aug. 9	30°F
1958	May 19	30°F	1958	Sept. 16	28°F

Frost Free Season	Shortest of Record	Longest of Record
1958 - 120 days	69 days - in 1915-1917	164 days - 1922
		50 yr. av. - 118 days

Temperatures	Lowest of Record	Highest of Record
	1936 Feb. 16 - 47°F	1936 July 6 114°F
	1958 Feb. 15, 16 - 18°F	1958 Aug. 9 103°F

1958 - Greatest 24 hr. Precipitation July 3 - 1.33 inches.

Table 1. Composition of 1959 yields from intermediate-pubescent wheatgrass plots seeded in 1954.

Variety	Composition of Yield			Total Plot production - lbs./acre
	Grass	Other grass	Weeds	
Pubescent wheatgrass	1194	144	143	1481
Ree wheatgrass	1178		333	1511
Nebraska 50	1119	118	111	1348
N. Dak. Pubescent	1004	303	273	1580
N. Dak. intermediate	952	145	393	1490
M-2-10820	945	16	474	1435
A-12496	865	166	200	1231
Average	1037	127	275	1439

Table 1. Daily Precipitation - 1959

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	T	0	T	0	.02	0	0	1.11	0	0	.13
2	T	0	.03	T	0	0	0	T	.06	0	0	0
3	T	.01	0	T	0	0	0	.12	0	0	0	0
4	0	.04	.03	0	0	0	.38	0	0	0	0	0
5	0	.04	T	0	.43	0	0	0	0	0	.25	0
6	0	T	T	0	T	0	0	0	.15	0	0	0
7	0	.05	0	T	0	0	.15	.06	0	.04	0	0
8	0	.07	0	T	0	.25	.16	.13	0	.15	0	0
9	0	T	0	.03	0	0	.03	0	0	T	0	0
10	0	0	0	0	.23	0	.13	0	0	.02	.02	0
11	0	0	T	.04	.06	0	0	0	0	T	T	0
12	0	0	0	0	0	0	0	0	0	T	T	0
13	0	T	0	0	0	0	0	.10	0	0	T	0
14	0	.51	T	0	0	0	T	0	0	0	0	0
15	0	0	.05	0	0	0	0	0	0	0	0	0
16	0	0	T	T	0	0	0	0	0	0	0	0
17	0	.02	T	.09	0	T	0	0	0	0	0	0
18	.01	T	0	0	0	.09	0	0	.40	0	0	0
19	T	0	0	0	.06	.06	0	.01	.03	0	0	T
20	.01	0	0	0	.01	.62	0	.10	T	0	0	.01
21	T	0	0	0	T	.91	0	.02	0	0	0	0
22	T	0	0	0	0	0	.06	0	1.27	.02	.10	T
23	0	0	0	0	0	.35	0	T	.10	0	0	T
24	.03	0	T	T	0	.03	0	0	0	0	T	T

25	.15	0	0	0	T	.08	.06	T	.38	T	.15	T
26	T	T	0	0	0	.58	0	T	.85	.10	T	T
27	0	.10	0	0	.01	.05	0	0	0	T	T	T
28	T	0	0	T	.31	.02	0	0	.04	0	T	T
29	.01		0	0	.01	T	0	0	.15	0	0	T
30	.03		T	0	.47	.02	0	0	0	T	T	T
31	0		0		.35		0	0		0		0
Sums	**.24**	**.84**	**.11**	**.16**	**1.94**	**3.08**	**.97**	**.54**	**4.54**	**.33**	**.52**	**.14**
Total Annual Precipitation - 13.41 inches.												

Table 2. Climatic Data Summary - 1959

Climatic Data	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Mean Seasonal
Precipitation														
1959 Monthly	.24	.84	.11	.16	1.94	3.08	.97	.54	4.54	.33	.52	.14	13.41	6.15
68 year average	.45	.45	.75	1.25	2.20	3.50	2.19	1.77	1.21	.87	.55	.41	15.60	9.15
Mean Temperature - Degrees Fahrenheit														
1959	9.8	5.6	31.5	40.3	50.7	65.5	69.7	69.7	55.0	38.6	22.0	21.5		
40 year average	10.2	13.2	24.9	41.8	52.2	61.6	68.1	66.2	56.0	43.7	28.1	16.2		
Wind velocity - Miles per hour														
1959						4.4	3.9	4.5	5.9	5.1	4.9			
34 year average						6.7	6.7	5.6	4.7	4.9	5.2			

Last killing frost in the spring		**First killing frost in the fall**	
1959	May 23 - 20 degrees F.	1959	September 16 - 30 degrees F.
45 year average	May 18	45 year average	September 15
Frost free season			
1959	May 23 to September 16 117 days		
45 year average	120 days		

Table 2. Hay yields from intermediate - pubescent wheatgrass yield plots seeded in 1954.						
Variety	**Oven-dry weight - lbs./acre**					**5-year average yield**
	1955	**1956**	**1957**	**1958**	**1959**	
Ree wheatgrass	3419	1484	2332	1815	1511	2112
Nebraska 50	3299	1296	2200	1879	1348	2004
M-2-10820	2724	1329	2290	2006	1435	1957
N. Dak. intermediate	2839	1385	2214	1735	1490	1933
Pubescent whtgr.	3131	1355	1979	1494	1481	1888
N. Dak. Pubescent	2580	1308	1905	1794	1580	1833
A - 12496	2647	1409	2017	1449	1231	1751
Average	2948	1367	2134	1739	1439	1925

Table 3. Wheat yields - Corn-wheat rotation fertilizer series - 1959

Wheat yields on:	Plot No.	Yield - bushels per acre			
		1	2	3	Av.
DD cornland, fertilized	58,112,116	12.0	8.6	9.2	9.9
DD cornland, corn fertilized in 1958	54,110,114	9.6	6.3	7.3	7.7
DD cornland, check	56,108,118	8.8	13.8	6.5	9.7

Table 4. Silage yields - Corn-wheat rotation fertilizer series - 1959

Corn silage yields on:	Plot No.	Green wt. Tons/acre @ 70% moisture			
		1	2	3	Av.
SP wheat stubble, fertilized	55,111,115	1.89	1.06	1.30	1.42
SP wheat stubble, fertilized in 1958	59,113,117	1.42	1.18	1.42	1.34
SP wheat stubble, check	57,109,119	2.36	2.01	.95	1.77

Table 5. Wheat yields, corn-wheat rotation fertilizer series 1955-59

Wheat yields on:	Yield bushels per acre					
	1955	1956	1957	1958	1959	5 yr. Av.
DD cornland, fertilized	27.8	3.3	14.7	25.7	9.9	16.3
DD cornland, corn fertilized in 1958	25.5	3.1	12.3	25.6	7.7	14.8
DD cornland, check	17.2	2.7	10.4	24.1	9.7	12.8

Table 6. Silage yields, corn-wheat rotation fertilizer series 1955-1959

	Yield - tons per acre

Corn silage yields on:	1955	1956	1957	1958	1959	5 yr. Av.
SP wheat stubble, fertilized	2.98	3.14	8.50	1.80	1.42	3.57
SP wheat stubble, fertilized previous year	2.96	3.49	9.30	2.30	1.34	3.88
SP wheat stubble, check	2.89	3.22	8.70	2.50	1.77	3.82

Table 4. Hay yields from intermediate wheatgrass variety plots seeded in 1958.

Variety	Dry weight - lbs./acre		Total plot yield - lbs. per acre
	Seeded grass	Weeds	
South Dakota 20	1273	9	1282
Ree wheatgrass	1268		1268
Idaho #3	1200	7	1207
Greenar	1165	22	1187
Nebraska 50	1129	22	1151
N. Dak. intermediate	1139	5	1144
Amur A-13046	1138	4	1142
Idaho #4	1041	3	1044
A-12496	831	29	860
Average	1132	11	1143

Table 5. Hay yields from crested wheatgrass varieties seeded in 1958.

Variety	Dry weight - lbs./acre		Total plot yield-lbs. per acre
	Grass	Weeds	
Commercial crested	1452		1452
Nordan crested	1427		1427
Commercial Fairway	1425		1425
Nebraska 3576 Fairway	1371		1371
Summit crested	1328	3	1331
South Dakota 15	1164	5	1169
Mandan 2359 crested	1157	2	1159
Nebraska 10	1137	9	1146
Turkish Fairway	753	36	789
A - 1770 Fairway	No stand		
Average*	1246	6	1252

*A-1770 not included.

Table 7. Wheat yields on continuous cropping, cornland and fallow, fertilized and unfertilized.

Treatment	Plots	Yield BPA			
		1	2	3	Av.
S.P. continuous	71,80,103	6.5	6.9	6.7	6.7
S.P. continuous, fertilized	70,81,102	10.2	7.5	6.5	8.1
Fallow	69,82,101	10.2	10.4	12.6	11.1
Fallow, fertilized	67,84,99	11.2	11.6	15.9	12.9
Disked cornland	63,88,95	7.7	6.7	7.5	7.3
Disked cornland, fertilized	65,86,97	12.4	5.5	7.9	8.6

Table 8. Wheat-Sorghum, wheat-corn and wheat-sudan in two year rotation.						
Wheat after forage sorghum:	Plot No.	60	90	92	121	average
Wheat yield-bushels per acre		11.0	5.7	15.3	13.6	11.4
Wheat after corn:	Plot No.	56	63	88	95	
Wheat yields- bushels per acre		8.8	7.7	6.7	7.5	7.7
Wheat after grain sorghum:						
Cultivated rows	Plot No.		28	30	32	
	See footnote 1.					
Solid drilled	Plot No.		29	31	33	
	See footnote 1.					
Wheat after sudan:	Plot No.		2	4	120	
Wheat yield-bushels per acre			9.8	6.5	11.2	9.2
Forage sorghum after wheat:	Plot No.	61	91	93	122	average
Silage yield-tons per acre at 70% moisture		2.13	1.23	2.18	1.36	1.7
Corn after wheat:	Plot No.	57	62	89	94	
Silage yield-tons per acre at 70% moisture		2.4	1.9	1.9	1.9	2.0
Grain sorghum after wheat:						
Cultivated rows:	Plot No.		28	30	32	
			2.7	2.6	1.6	2.3
Solid drilled:	Plot No.		29	31	33	
	Total failure.					
Sudan after wheat:	Plot No.		1	3	5	
Silage yield-tons per acre at 70% moisture			1.9	2.3	1.9	2.0
[1]All grain sorghum plots were a total failure in 1958 and were plowed down in July. Plots will be considered in phase in1960.						

Table 9. Yields in the methods of planting corn trial.

Corn silage yields on:	**Yield-tons per acre at 70% moisture.**			
	1	2	3	Av.
38" rows	1.45	2.65	1.85	1.98
42" rows	2.01	1.42	1.42	1.62
42" wheel track planting	1.18	1.30	1.30	1.26
Wheat yields after corn on:	**Yield-bushels per acre**			
	1	2	3	Av.
38" rows	5.5	7.9	5.5	6.3
42" rows	8.6	3.9	7.5	6.7
42" wheel track planting	7.7	4.5	5.5	5.9

Table 10. Continuous cropping - 1959

Crop	Yield-bushels per acre.					
	Spring plowed		Fall plowed		Fallow	
	1959	53 yr. Av.	1959	53 yr. Av.	1959	53 yr. Av.
Wheat	6.5	11.4	3.7	10.5	11.0	18.8
Oats	17.4	26.2	5.9	23.7	23.9	44.1
Barley	5.3	17.2	6.9	15.8	16.1	24.2
	Yield-tons per acre at 70% moisture.					
	Spring plowed		Fall plowed		Fallow	
	1959	53 yr. Av.	1959	53 yr. Av.	1959	53 yr. Av.
Corn silage	3.2	3.1	3.7	3.1	4.85	3.6

Table 11. Yields on stubble land tilled in the spring with the moldboard plow, the double disk and the one-way disk.

Treatment	1959 Yield - Bushels per acre.				
	1	2	3	4	Av.
Spring plowing	5.5	6.5	4.3	8.8	6.3
One-way disking	8.3	7.1	14.1	8.3	9.5
Double disking	3.1	4.3	9.0	8.6	6.3

Table 12. Summary of yields on stubble land tilled in the spring with the moldboard plow, the double disk and the one-way disk, - 1955 - 1959.

Year	Average yield in bushels per acre.		
	Spring plowing	One-way disking	Double disking
1955	22.0	17.6	14.5
1956	14.2	11.5	9.3
1957	18.0	16.7	15.5
1958	19.3	18.7	15.1
1959	6.3	9.5	6.3
Average	16.0	14.8	12.1

Table 13. Silage yields from the oats-peas and wheat vs corn and wheat rotations.				
Crop	**Silage yield tons per acre @ 70% moisture**			
	1957	**1958**	**1959**	**Av.**
Oats-peas	4.3	3.7	2.0	3.3
Corn	7.0	2.3	2.0	3.8

Table 14. Wheat yields from the oats - peas and wheat vs corn and wheat rotations.				
Previous crop	**Wheat yields in bushel per acre.**			
	1957	**1958**	**1959**	**Av.**
Oats - peas	21.9	17.2	9.0	16.0
Corn	28.7	23.5	9.9	20.7

Table 15. Annual cool season Forage Production trial seeded on stubble land - 1959					
Crop	**Weight in lbs. per acre @ 12% moisture**				**% moisture at harvest**
	1	**2**	**3**	**Av.**	
Madison Hairy Vetch	785	589	392	589	74
Austrian winter peas	1245	1452	1245	1314	70
Oats plus vetch	2108	1874	1639	1874	62
Oats plus Austrian peas	1383	1613	2305	1767	63
Oats plus Canadian peas	1613	1844	2074	1844	63
Oats	1815	1588	1815	1739	64
Oats plus 50 lbs. N/acre	2996	1613	4149	2919	63
Oats plus 100 lbs. N/acre	1874	1874	3045	2264	62

Table 16. Minimum amount of small grain residue required to control erosion[1]

Soil Texture	Minimum amount of small grain residue required in pounds per acre to control erosion
Coarse - textured soils - loamy sand, loamy fine sand (mapped as L texture)	1750
Moderately coarse and fine textured soils - fine sandy loam (mapped as S texture)	1250
Silty clay (mapped as H texture)	1250
Clay (mapped as V texture)	1250
Medium and moderately fine textured soils - very fine sandy loam, loam, silty loam (mapped as M texture)	750
Clay loam, sandy clay loam, silty clay loam (mapped as F texture)	750

[1]from S C S Standards and specifications for Soil Conservation practices.

Table 17. Percentage of residue conserved after each operation with different types of tillage machinery[1]

Type of equipment	Percentage of Residue conserved after each operation.
Blade or sweeps wider than 24"	90
Heavy-duty cultivator with sweeps 16-22" wide	85
Duckfoot cultivator with sweeps 9-14" wide	80
Rod weeder with shovel attachment	90 80
Chisel fall operation	85 70
One-way disk	50*
Flexible disk harrow	75*

* This number is an average; variation occurs depending on angle of cut, depth, and speed.

[1]From SCS Standards and specifications for soil conservation practices.

Table 18. Yields from the stubble mulch fallow trial - 1959				
Tillage method	**wheat yield - bushels per acre**			
	1	**2**	**3**	**av.**
Moldboard plow	7.1	9.6	15.1	10.6
One way disk	11.2	12.0	13.2	12.1
10 inch sweep	10.4	11.8	13.8	12.0
24 inch sweep	5.9	9.4	12.8	9.4
5 foot blade	12.6	13.4	15.7	13.8

Table 19. Summary of relative effectiveness of various tillage treatments for controlling wind erosion on sandy loam soil

Treatment	Cloddiness[1]	Residue[2]	Roughness[3]	Natural Wind Erodibility Index[4]
Moldboard plow	38%	250 lbs/acre	2.5	1.56
One way disk	28%	700 lbs/acre	3.0	.70
10 inch shovel	25%	800 lbs/acre	3.0	.70
Wide sweep	31%	2500 lbs/acre	5.0	.07

[1]Percentage of clods larger than .84 mm in diameter
[2]Estimated dry weight of residue in pounds per acre
[3]Estimated roughness coefficient
[4]Values below .25 considered adequate control for fields of unlimited size in North Dakota

Table 20. Roughage Production Trial - 1959

Description	Green weight tons per acre at 70% moisture				
	1	2	3	4	Av.
Nodakhybrid 208	2.40	1.92	2.04	4.07	2.61
Nodakhybrid 301	1.68	1.80	1.92	2.16	1.89
Nodakhybrid 305	1.68	1.56	3.36	2.64	2.31
Nodakhybrid 306	2.28	2.28	2.40	3.12	2.52
Nodakhybrid 307	1.92	2.28	2.28	2.40	2.22
Nodakhybrid 403	2.40	2.28	2.40	2.76	2.46
AES 101	2.76	2.40	2.40	2.64	2.55
AES 201	2.88	2.64	2.16	2.28	2.49
AES 202	2.28	2.40	2.04	1.92	2.16
AES 203	2.40	2.76	1.92	2.28	2.34
Rainbow flint (Mandan)	3.36	2.76	2.88	2.28	2.82
U.M. 164	2.40	3.12	2.76	2.40	2.67
Morden 77	3.00	2.16	2.40	2.28	2.46
Falconer	2.40	2.04	2.28	2.52	2.31
Agsco Sugarbush	3.12	2.64	2.52	2.40	2.67
Agsco Hybrid 82	2.64	2.40	2.40	2.40	2.46
Agsco Multicross 80	2.40	2.28	2.64	2.88	2.55
Kings Crost KF-1	2.16	2.40	2.64	2.88	2.52
Kings Crost KC-3	2.52	3.36	3.12	2.88	2.97
Experimental 3-3	2.28	2.40	2.28	2.88	2.31
Jacques 870 J	3.36	2.88	2.52	3.36	3.03
Jacques 853 J	2.16	2.76	2.40	1.80	2.28
Jacques 820 J	1.92	2.04	2.04	2.16	2.04

Table 21. Agronomic data from the Barley Variety Trial - 1959

Description	Yield Bushel per acre					Test Weight	Height Inches	Dates	
	1	2	3	4	Av.			Head	Ripe
Titan	39.9	44.0	30.3	29.4	35.9	44.0	25	6-27	7-30
Kindred	23.4	26.7	19.8	21.3	22.8	46.0	30	6-25	7-30
Traill	32.7	39.9	26.7	25.3	31.2	46.5	25	6-27	7-31
Liberty	36.0	44.0	26.7	27.5	33.6	45.0	25	6-26	7-31
Tregal	36.4	45.7	27.5	28.2	34.5	46.0	22	6-27	7-31
B-120	35.8	48.1	27.5	25.6	34.3	45.5	22	6-27	7-31
Manchuria	20.6	24.8	18.4	17.2	20.3	43.0	22	6-29	7-31
Forrest	30.8	35.8	27.5	24.8	29.7	47.5	24	7-1	8-1
Swan	27.5	34.4	22.0	22.6	26.6	45.0	27	7-1	8-2
Husky	27.5	34.4	28.9	27.5	29.6	44.0	26	7-2	8-1
Parkland	24.8	28.3	23.9	25.3	25.6	45.0	27	7-1	7-31
Vantage	28.9	29.2	27.0	26.1	27.8	44.5	26	6-30	8-1
Hannchen	26.4	31.6	33.0	31.1	30.5	48.0	23	7-1	7-31
Betzes	29.6	28.9	33.0	35.1	31.7	48.5	22	6-30	7-30
Dix 45-297	24.5	23.9	26.7	24.8	25.0	44.5	22	6-30	7-31

Table 22. Comparative yields - Barley Variety Trials - 1953-1959

Description	Yield in bushels per acre							Averages			
	1953	1954	1955	195	1957	1958	1959	'57-'59	'56-'59	'54-'59	'53-'59
Manchuria[1]	36.1	21.3	38.7	23.4	42.5	38.7	20.3	33.8	31.2	30.8	31.6
Kindred[1]	32.8	17.4	37.2	16.4	30.3	33.7	22.8	28.9	25.8	26.3	27.2
Traill	36.1	22.4	48.6	21.2	48.8	62.4	31.2	47.5	40.9	39.1	38.7

Tregal	32.8	23.1	45.6	23.7	47.0	56.5	34.5	46.0	40.4	38.4	37.6
Titan	37.0	19.6	43.3	21.5	59.0	66.2	35.9	53.7	45.7	40.9	40.4
Hannchen	28.2	21.5	42.4	25.1	49.9	62.1	30.5	47.5	41.9	38.6	37.1
Vantage	15.5	23.8	39.2	24.6	55.4	63.4	27.8	48.9	42.8	39.0	35.7
Dix 45-297	31.3	22.4	38.7	26.3	52.1	53.6	25.0	43.6	39.3	36.4	35.6
Husky		24.7	48.6	26.4	56.6	60.2	29.6	48.8	43.2	41.0	
Parkland				18.5	43.5	52.8	25.6	40.6	35.1		
Forrest					49.4	57.2	29.7	45.4			
Liberty					50.2	58.4	33.6	47.4			
Betzes					53.3	65.3	31.7	50.1			
LSD @ 5%	3.9	2.7	7.1	4.0	2.7	4.5	5.7				

Table 23. Agronomic data from the Great Plains Nursery - 1959

Description	Cl No	Yield - Bushel per acre				Test Wt	Ht Inches	Dates	
		1	2	3	Av.			Head	Ripe
Flynn I	5911	15.8	19.3	16.0	17.0	39.0	16	6-29	7-22
Munsing	6009	13.8	17.5	15.3	15.5	45.0	13	6-29	7-22
Otis	7557	17.5	15.3	15.8	16.2	48.0	14	6-28	7-26
Custer	8053	11.0	11.8	9.5	10.8	44.0	14	6-29	7-26
Hiland	9530	16.0	15.3	14.0	15.1	42.0	15	6-28	7-22
P.I. 168250	7837	12.5	16.3	15.3	14.7	47.0	14	6-28	7-27
Dekap	3351	11.8	20.3	19.8	17.3	45.0	16	6-28	7-22
Trebi x Spartan	10003	7.5	13.5	13.3	11.4	47.0	16	6-27	7-22
Cl7114 x Velvon II	10006	10.0	13.0	13.8	12.3	41.0	16	6-28	7-27
Korol		14.5	20.5	22.0	19.0	47.0	18	6-28	7-27
Piroline	6300	15.5	21.3	21.3	19.4	45.0	15	6-27	7-23
Glacier x Titan	9558	12.5	18.8	19.8	17.0	44.0	15	6-25	7-26
Velvon II x Spartan	10421	11.3	16.3	16.3	14.6	41.0	18	6-28	7-27
Betzes	10422	17.5	21.8	15.0	18.1	44.0	20	6-29	7-27
5401-42 (Vantage x Compana)		17.3	17.5	22.8	19.2	40.0	15	6-26	7-26
4363-32 (36 Ab 1991 x Titan)		19.0	10.5	17.3	15.6	41.0	16	6-28	7-27
Glacier x Compana 47-7415-v-9		15.8	12.3	9.8	12.6	44.0	18	6-28	7-27

Table 24. Agronomic data from the Uniform Regional Flax Nursery - 1959

Description	C.I. No.	Yield - Bu per acre				Days to Bloom	Height Inches
		1	2	3	Av.		
Bison	389	4.8	5.4	5.4	5.2	55	15
Redwing	320	4.6	3.8	5.0	4.5	50	17
Redwood	1130	5.4	7.6	3.0	5.3	55	12
Marine	1135	6.0	7.0	5.4	6.1	50	16
Arny	1658	5.0	6.4	1.2	4.2	60	14
Marine (High oil)	1661	5.4	5.6	7.2	6.1	50	19
(Renew-Bison)(Koto-Redwing) x Redwood	1663	4.4	6.8	7.0	6.1	55	15
C.I. 1559 (High oil)	1664	4.8	4.8	5.6	5.1	60	15
B5128 Composite	1665	4.8	5.0	5.8	5.2	55	17
Sheyenne x C.I. 1332	1666	4.4	5.0	5.2	4.9	48	19
C.I. 1118 x C.I. 1116	1667	5.0	5.0	5.4	5.1	55	13
Redwood x Cascade	1669	6.0	5.8	4.6	5.5	58	12
Rocket x C.I. 1132	1670	5.4	3.4	3.4	4.1	60	12
Repitible 1117 x Redson	1825	5.2	5.2	4.2	4.9	54	18
(OTT770B-Arg 8C) (Arrow-C.I.975)	1826	3.2	4.0	4.6	3.9	55	12
Redwood (High oil)	1822	4.4	5.0	5.4	4.9	55	12
(Renew-Bison) (Koto-Redwing) x Redwood	1823	5.2	5.8	5.0	5.3	55	13
Dakota-Crystal x Bison	1915	5.8	5.4	7.0	6.1	55	13

Table 25. Agronomic data from the Oats Variety Trial - 1959

Description	Yield - Bu per acre					Test Weight	Height Inches	Dates	
	1	2	3	4	Av.			Head	Ripe
Andrew	35.8	36.3	28.8	31.9	33.2	36.0	23	6-22	7-30
Ransom	41.2	38.1	27.6	29.7	34.2	36.5	26	6-22	7-30
Minhafer	29.9	27.8	24.7	24.7	26.8	34.0	25	6-22	7-30
Clintland 60	26.8	24.7	22.7	20.6	23.7	37.0	25	6-22	7-30
Burnett	33.0	27.2	33.0	21.4	28.7	35.0	24	6-22	7-30
Marion	35.0	33.8	38.1	25.8	33.2	34.0	21	6-22	7-30
Ajax	33.0	34.0	37.9	25.1	32.5	33.0	27	6-25	7-30
Gopher	40.2	38.3	41.2	23.7	35.9	36.0	22	6-22	7-30
Sauk	4.8	39.1	46.1	26.4	38.1	35.0	24	6-27	8-2
Garry	36.1	44.3	46.6	21.8	37.2	34.0	25	6-28	8-3
Rodney	37.1	19.4	45.7	26.8	39.8	37.0	21	6-28	8-3
Mo 0-205	30.9	45.3	42.2	24.7	35.8	35.0	24	6-22	7-31
Vicar, (actual)	24.7	35.0	33.0	23.1	29.0	44.0	23	6-30	8-3

Table 26. Comparative yields - Oat Variety Trials 1954-1959

Description	Yield in bushels per acre						Averages				
	1954	1955	1956	1957	1958	1959	'58-'59	'57-'59	'56-59	'55-'59	'54-'59
Gopher	28.7	78..8	21.4	75.9	80.4	35.9	58.2	64.1	53.4	58.5	53.5
Marion	28.9	70.6	20.3	78.8	65.6	33.2	49.4	59.2	49.5	53.7	49.6
Ajax	28.6	66.7	21.4	74.4	63.3	32.5	47.9	56.7	47.9	51.7	47.8
Andrew	30.4	57.4	33.3	61.8	72.9	33.2	53.1	56.0	50.3	51.7	48.2
Mo. 0-205	30.4	65.4	24.7	75.2	67.5	35.8	51.7	59.5	50.8	53.7	49.8
Ransom		65.2	25.2	55.6	63.8	34.2	49.0	51.2	44.7	48.8	
Minhafer				63.4	63.6	26.8	45.2	51.3			
Burnett				77.3	63.2	28.7	46.0	56.4			
Rodney	26.2	71.1	22.5	63.9	64.3	39.8	52.1	56.0	47.6	52.3	48.0
Garry sel.	27.8	71.6	19.5	61.3	64.9	37.2	51.1	54.5	45.7	50.9	47.1
Sauk			23.0	77.0	68.5	38.1	53.5	61.2	51.7		
Vicar hullless[1]					68.0	41.4	54.7				
LSD @ 5%	4.2	8.5	5.2	7.3	10.4	2.9					

[1]Yield adjusted to allow 30% for hull.

Table 27. Agronomic data from the North Central Uniform Oat Nursery - 1959

Description	Yield - Bu per acre				Test Wt.	Ht. Inches	Dates	
	1	2	3	Av.			Head	Ripe
Ajax x (Hawk - Vict.)	18.8	22.0	22.4	21.1	28.0	22	6-28	7-22
Ajax x Ransom	12.0	12.8	15.6	13.5	32.0	22	6-25	7-22
Andrew	10.0	22.0	20.0	17.3	31.0	19	6-26	7-22
Beav. x (Gar. - Clint.) x Clintland	10.0	14.0	14.8	12.9	32.0	19	6-27	7-22

(B-R x H-J) x Landh.) x Andrew^3	5.2	21.6	22.0	16.3	32.0	20	6-27	7-22
Clintland	4.0	10.8	15.2	10.0	30.0	20	6-27	7-22
Clintland 60	4.4	11.2	11.6	9.1	30.0	20	6-27	7-22
Clintl^{5}x)Landh x (MxHJ) x Andrew)	4.0	11.2	10.0	8.4	30.0	20	6-27	7-22
Clintland irradiated	3.2	10.0	11.2	8.1	30.0	20	6-27	7-22
Clintl x (Gar x Hawk. -Vict.)	4.4	15.6	14.0	11.3	30.0	20	6-26	7-22
Clintl x (Gar x Hawk. -Vict.)	13.2	24.0	25.6	20.9	31.5	18	6-28	7-22
Clintl x (Gar x Hawk. -Vict.)	14.0	24.0	22.0	20.0	31.0	19	6-26	7-25
Clintl x (Gar x Hawk. -Vict.)	6.4	7.2	15.8	9.8	30.0	18	6-22	7-22
Clinton 59	7.8	16.8	16.8	13.8	31.5	22	6-22	7-22
Clint. x (Vict. x H-B)XVictory	4.0	11.2	13.2	9.5	30.0	17	6-22	7-22
Col-Mar x (Vict. x H-B) x Vict x H-A)	9.6	14.4	20.0	14.7	32.0	21	6-22	7-22
Goodfield	7.6	10.0	12.0	9.9	30.0	18	6-22	7-22
Gopher	13.2	16.8	18.0	16.0	33.0	20	6-22	7-22
Landh x (Mindo x H-J) x Andrew	12.0	18.0	23.6	17.9	32.5	19	6-25	7-22
Macon	11.6	14.0	17.2	14.3	32.5	22	6-22	7-22
Mark-Rainb x D69 - Bond	11.6	14.4	18.4	14.8	32.5	19	6-21	7-22
Minhafer	17.2	20.4	24.8	20.8	30.0	20	6-26	7-24
Minton	18.8	21.6	26.8	22.4	26.5	20	6-26	7-25
Mo 0 - 205	21.2	17.6	25.2	21.3	32.5	20	6-24	7-22
Nehawka	9.6	11.2	16.4	12.4	32.5	19	6-22	7-22
Rodney x Landh - Forvic	15.2	12.0	16.8	14.7	32.5	19	6-22	7-22
Rodney x (SF x Clinton^3)	17.2	18.0	20.4	18.5	32.0	20	6-25	7-22
Simcoe	23.2	26.0	28.0	25.7	31.0	21	6-26	7-22
(Vict x H-B) x Spooner) x Ransom	9.6	13.6	22.8	15.3	32.5	23	6-22	7-22

Table 28. Yield data from the Rye Variety Trial - 1959							
Description	**Yield - Bu per acre**					**Test Weight**	**Height Inches**
	1	**2**	**3**	**4**	**Av.**		
Dakold	12.4	14.7	14.1	11.8	13.3	53.0	26
Pierre	14.1	13.0	14.7	11.2	13.3	53.5	28
Caribou	13.6	16.5	14.4	11.8	14.1	54.0	29
Antelope	11.8	15.9	13.6	14.4	13.9	54.0	30

Table 29. Comparative Yields - Rye Variety Trials - 1954-1959								
Description	**Yield - Bu per acre**						**Averages**	
	1954	**1955**	**1956**	**1957**	**1958**	**1959**	**'56-'59**	**'54-'59**
Dakold	11.4	37.2	2.0	24.5	10.3	13.3	12.5	16.5
Pierre	11.5	28.9	2.6	17.3	11.0	13.3	11.1	14.1
Caribou	10.6	39.9	2.9	19.2	12.2	14.1	12.1	16.5
Antelope			2.0	21.8	12.1	13.9	12.5	

Table 30. Yields from the safflower - flax trial - 1959				
Description	**Yield in pounds per acre**			
	1	**2**	**3**	**Av.**
Pacific No 1	312	288	288	296
Nebraska 10	264	288	326	293
B5128 flax	312	340	300	317

Table 31. Agronomic data from the Regional Safflower Nursery Trial - 1959								
Description	**Yield - Lbs. per acre**					**Test Weight**	**First Bloom**	**Height Inches**
	1	**2**	**3**	**4**	**Av.**			
N-10	281.4	287.8	275.0	249.4	273.4	37.0	7-21	14
N-6	294.2	172.7	153.5	211.1	207.8	42.0	7-25	14
Gila	217.5	243.1	230.3	255.8	236.7	39.5	7-21	15
A-5731	236.7	300.6	371.0	287.8	299.0	37.0	7-21	18
Pacific No 1	255.8	399.0	230.3	153.5	244.7	39.0	7-22	13
N-4042	287.8	243.1	230.3	275.0	259.1	39.0	7-25	15
N-4051	230.3	255.8	230.3	319.8	259.1	41.5	7-26	18
N-4054	166.3	307.0	249.4	275.0	249.4	40.0	7-26	14
N-10 x W014 (BC7)	217.5	243.1	281.4	275.0	254.3	39.0	7-21	13

Table 31a. Oil analysis of safflower strains grown in the Uniform Safflower Nursery in 1959.		
	% Oil	**Iodine No.**
BC7	36.4	146
Pacific #1	36.0	146
N-4054	33.2	147
N-6	32.4	149
N-10	35.6	145
N-4051	30.2	149
Gila	37.2	146
A-5731	37.6	146
N-4042	31.2	149

Table 32. Hard Red Winter Wheat Northern Regional Performance Nursery - 1959		
	Variety	**C.I. No.**
1.	Kharkof	1442[1]
2.	Minter	12138[1]
3.	Yogo	8033[1]
4.	Nebred	10094
5.	Pawnee x Nebred	13015
6.	Pawnee x Cheyenne	13190
7.	Pawnee x Iowin-T. tim-Wis 5	13279
8.	Cheyenne	8885
9.	Cheyenne Selection (WS 432)	13192
10.	do. (WS 318)	13193
11.	Minnesota Selection (III-54-9)	13505
12.	do. (III-54-25)	13506
13.	do. (III-54-58)	13280
14.	do. (III-54-60	13281
15.	do. (III-54-10)	13552
16.	Yogo x (Turkey x Oro 221)-66	13427
17.	Red Chief x Cheyenne	13016
18.	Kan-HF-Tq-Med-Hope x Cim.	13023
19.	South Dakota Selection (S.D.56-45)	13199
20.	do. (S.D.56-53)	13526
21.	do. (S.D.56-281)	13527
22.	do (S.D.56-514)	13528
23.	do. (S.D. 56-825)	13529
[1]Permanent check variety.		

Table 33. Agronomic data from the Hard Red Spring Wheat Variety Trial -1959

Description	Yield - Bu per acre					Test Weight	Height Inches	Dates	
	1	2	3	4	Av.			Head	Ripe
Lee	16.3	18.2	12.1	13.2	15.0	58.0	23	6-26	8-1
Rushmore	16.1	18.5	11.4	12.1	14.5	58.5	24	6-26	8-1
Selkirk	13.8	16.0	11.0	12.5	13.3	57.0	25	6-29	8-1
Il-53-541	16.0	17.4	11.4	13.0	14.5	58.0	26	6-26	8-3
Canthatch	17.1	16.5	12.3	14.7	15.2	58.0	27	6-27	8-2
Mida	15.2	15.8	12.7	13.2	14.2	59.0	27	6-28	8-3
Thatcher	16.0	16.1	11.0	12.7	14.0	58.5	24	6-27	8-2
Conley	12.5	14.3	11.6	11.0	12.4	57.5	25	6-30	8-5
Chinook	14.7	15.8	13.0	12.5	14.0	58.0	24	6-25	8-3
Karnvor	15.4	18.2	16.7	13.2	15.9	56.0	25	7-4	8-6
Marquis	22.2	16.9	13.4	12.1	16.2	57.0	25	6-29	8-4
Red Fife	13.8	16.1	14.5	13.2	14.4	57.5	26	6-29	8-5

Table 34. Comparative yields - Hard Red Spring Wheat Variety Trial 1954-1959								
Description	**Yield in bushels per acre**						**Averages**	
	1954	**1955**	**1956**	**1957**	**1958**	**1959**	**'58-'59**	**'54-'59**
Lee	11.9	28.5	11.4	32.6	22.8	15.0	18.9	20.4
Selkirk	12.7	28.6	12.2	23.0	28.6	13.3	21.0	19.7
Conley	14.7	25.3	11.9	25.3	28.4	12.4	20.4	19.7
Rushmore	11.6	25.9	10.3	25.7	28.8	14.5	21.7	19.5
Mida	10.5	28.6	11.9	27.2	28.2	14.2	21.2	20.1
Thatcher	9.9	25.2	12.4	30.1	29.9	14.0	22.0	20.3
Marquis	10.5	25.6	12.5	27.8	29.5	16.2	22.9	20.4
Chinook	10.2	27.1	10.9	26.4	28.6	14.0	21.3	19.5
Canthatch					34.2	15.2	24.7	
Karnvor					31.8	15.9	23.9	
LSD @ 5%	1.4	2.6	2.0	2.7	3.7	2.3		

Table 35. Agronomic data from the Durum Wheat Variety Trial - 1959

Description	Yield - Bu per acre					Test Weight	Height Inches	Dates	
	1	2	3	4	Av.			Head	Ripe
Ld 392	13.9	16.7	15.2	16.3	15.5	57.0	26	6-27	8-3
Ld 389	17.4	17.4	18.2	17.8	17.7	59.5	25	6-27	8-3
Sentry	14.1	13.2	14.3	14.3	14.0	59.5	25	6-26	8-2
Yuma	12.3	13.6	13.2	13.6	13.2	58.0	24	6-30	8-5
Langdon	17.1	16.1	14.1	14.3	15.4	59.5	26	6-28	8-5
Ramsey	15.4	15.6	16.5	14.3	15.5	60.0	28	6-30	8-5
Mindum	16.0	14.3	15.8	13.0	14.8	60.0	34	6-30	8-6

Table 36. Comparative yields - Durum Variety Trial 1954-1959									
Description	**Yield in bushels per acre**						**Averages**		
	1954	**1955**	**1956**	**1957**	**1958**	**1959**	**'58-'59**	**'55-'59**	**'54-'59**
Mindum	8.0	23.3	10.8	31.5	29.0	14.8	21.9	21.9	19.6
Sentry	12.1	29.7	9.8	30.8	28.6	14.0	21.3	22.6	20.8
Langdon		26.4	10.7	32.8	28.1	15.4	21.8	22.7	
Yuma		25.3	8.3	30.0	28.9	13.2	21.1	21.1	
Ramsey		21.4	7.5	36.6	30.2	15.5	22.9	22.2	
Ld 392					34.7	15.5	25.1		
Ld 389					34.3	17.7	26.0		
LSD @ 5%	1.4	2.6	2.0	2.7	3.7	2.3			

Table 37. Agronomic data from the Uniform Regional Wheat Nursery - 1959

Description	CI No	Yield - Bu per acre				Test Wt.	Ht. Inches	Dates	
		1	2	3	Av.			Head	Ripe
Marquis	3641	11.4	9.4	9.8	10.2	56.5	26	6-29	8-1
Thatcher	10003	10.8	8.0	11.0	9.9	57.0	22	6-27	7-29
Selkirk	13100	8.4	7.4	8.2	8.0	54.0	21	6-27	7-29
Lee	12488	10.0	6.2	12.4	9.5	56.0	21	6-26	7-31
Conley	13157	10.0	5.0	10.0	8.3	55.0	18	6-28	8-2
Henry[7] x P.I. 94587	13457	13.4	6.4	10.4	10.1	57.5	19	6-25	7-29
Conley x ND40-2	13462	12.0	6.2	7.6	8.6	55.0	18	6-28	8-1
Lee x ND 34	13322	10.6	8.4	11.0	10.0	59.5	19	6-27	7-31
ND 4 x Lee	13324	11.0	6.2	7.0	8.1	55.0	20	6-27	8-2
ND 81 x Lee	13349	11.0	8.0	8.6	9.2	56.0	21	6-27	7-29
K338AA x N2350	13350	13.0	8.0	9.6	10.2	56.0	19	6-27	7-29
ND 5 X ND 36	13460	9.6	8.0	10.4	9.3	57.0	21	6-26	8-1
Lee x ND 34	13461	9.0	7.4	9.4	8.6	58.0	16	6-27	7-31
ND 81 X Conley	13451	11.6	7.0	10.4	9.7	58.0	18	6-28	7-29
ND 81 x Conley	13452	11.2	7.6	13.2	10.7	56.5	19	6-27	8-1
Lee-ND 81 sib x Lee	13453	13.4	8.0	13.4	11.6	57.0	18	6-28	8-1
II-44-29 x Lee	13408	16.0	9.0	11.0	12.0	56.0	22	6-30	8-1
Lee x Kenya farmer	13454	11.8	9.0	8.8	9.9	59.0	17	6-28	8-2
II-44-29 x Lee[2]	13455	12.0	8.6	9.2	9.9	58.0	23	6-28	7-31
II-44-29 x Lee[3]	13456	13.0	10.0	10.6	11.2	57.5	24	6-27	8-1
II-44-29 x Lee[3]	13415	12.2	10.0	12.8	11.7	56.5	24	6-27	8-1
II-44-29 x Lee[3]	13458	13.2	9.4	11.0	11.2	57.5	22	6-27	7-29

Il-44-29 x Lee[3]	13459	11.8	9.2	8.6	9.9	58.0	22	6-27	7-29
Il-44-29 x Lee[3]	13416	13.2	12.6	8.8	11.5	56.0	20	6-27	7-29
Thatcher x RL2564	13332	8.8	8.8	11.2	9.6	57.0	20	6-26	7-29
Thatcher[6] x Kenya farmer	13345	10.6	13.4	11.6	11.9	57.0	23	6-27	7-29
Reward x CI 12632	13406	8.6	11.0	11.2	10.3	59.5	23	6-28	7-29

Table 38. Agronomic data from the Uniform Bunt Nursery - 1959

Description	C.I. No	% Bunt		
		1	2	Av.
Marquis	3641	T	0	T
Thatcher	10003	0	0	0
Selkirk	13100	0	0	0
Lee	12488	T	0	T
Conley	13157	10	0	5
Henry[7] x P.I. 94587	13457	0	0	0
Conley x ND 40-2	13462	T	0	T
Lee x ND 34	13322	T	10	5
ND 4 x Lee	13324	0	0	0
ND 81 x Lee	13349	10	T	5
K 338AA x N2350	13350	25	20	23
ND 5 x ND 36	13460	0	10	5
Lee x ND 34	13461	T	0	T
ND 81 x Conley	13451	0	0	0
ND 81 x Conley	13452	10	0	5
Lee-ND 81 sib x Lee	13453	5	10	8
II-44-29 x Lee[3]	13408	10	5	8
Lee x Kenya Farmer	13454	25	10	18
II-44-29 x Lee[2]	13455	10	20	15
II-44-29 x Lee[3]	13456	T	10	5
II-44-29 x Lee[3]	13415	5	10	8
II-44-29 x Lee[3]	13458	5	5	5

Il-44-29 x Lee[3]	13459	5	5	5
Il-44-29 x Lee[3]	13416	T	0	T
Thatcher x R.L. 2564	13332	0	0	0
Thatcher[6] x Kenya farmer	13345	0	0	0
Reward x C.I. 12632	13406	50	38	44
Ulka	11478	100	100	100

Table 39. Agronomic data from the Advanced Station Wheat Nursery - 1959

Description	Yield - Bu per acre				Test Wt.	Ht. Inches	Dates		1959 Key
	1	2	3	Av.			Head	Ripe	
Pilot-Premier x Il-44-20	15.0	15.4	12.6	14.3	56.0	29	6-29	7-29	1
Pilot-Premier x Il-44-22	17.2	15.4	11.6	14.7	55.0	30	6-30	7-30	2
Pilot-Premier x Il-44-22	13.4	11.6	10.4	11.8	55.0	25	6-30	7-30	3
NNo 1552-Mida x H-44-1018-Mercury	15.2	14.6	12.6	14.1	54.0	28	6-29	8-3	4
NNo 1552-Mida x H-44-1018-Mercury	15.6	14.6	13.4	14.5	54.0	27	6-30	8-3	5
NNo 1552-Mida x H-44-1018-Mercury	17.2	13.2	11.8	14.1	53.0	28	6-29	8-3	6
NNo 1552-Mida x H-44-1018-Mercury	14.6	11.0	11.0	12.2	57.5	25	6-27	8-2	7
Frontana-Thatcher x NNo 2083-NNo2247	14.0	14.4	12.6	13.7	56.0	28	6-28	8-3	8
Frontana-Thatcher x NNo 2083-NNo2247	14.0	13.0	11.6	12.9	57.0	26	6-28	8-3	9
Frontana-Thatcher x NNo 2083-NNo2247	15.0	12.6	13.0	13.5	56.5	27	6-28	8-2	10
W 240-Rescue x NNo 1924-NNo1953	15.2	13.2	14.6	14.3	57.5	28	6-28	8-1	11
K 58-Newthatch x No 3906	11.0	11.0	12.2	11.4	57.0	23	6-28	8-1	12
W 240-Rescue x No 3961	13.2	12.4	11.6	12.4	58.5	25	6-28	8-2	13
Frontana-Thatcher x NNo2083-NNo2247	14.4	12.6	11.8	12.9	57.5	27	6-28	8-3	14
Selkirk Check	10.0	9.2	10.4	9.9	55.5	23	6-28	8-2	
Conley Check	10.6	10.0	9.2	9.9	57.0	26	6-28	8-3	

Lee Check	12.0	12.8	11.0	11.9	57.5	23	6-27	8-2	

Table 40. Average yields - Advanced Station Wheat Nursery 1956-1959					
Description	**1956**	**1957**	**1958**	**1959**	**4 Year Average**
Pilot-Premier x Il-44-20	16.9	20.3	35.5	14.3	21.8
Pilot-Premier x Il-44-22	14.5	22.3	35.3	14.7	21.7
Pilot-Premier x Il-44-22	17.3	20.7	36.0	11.8	21.5
NNo 1552-Mida x H44-1018-Mercury	15.7	20.9	35.3	14.1	21.5
NNo 1552-Mida x H44-1018-Mercury	16.6	25.5	35.5	14.5	23.0
NNo 1552-Mida x H44-1018-Mercury	15.6	22.9	36.1	14.1	22.2
NNo 1552-Mida x H44-1018-Mercury	14.1	21.9	36.5	12.2	21.2
Frontana-Thatcher x NNo 2083-NNo 2247	14.0	25.3	37.8	13.7	22.7
Frontana-Thatcher x NNo 2083-NNo 2247	14.2	23.1	36.2	12.9	21.6
Frontana-Thatcher x NNo 2083-NNo 2247	12.4	26.1	34.9	13.5	21.7
W 240-Rescue x NNo x 1924-NNo 1953	12.6	25.5	34.8	14.3	21.8
K 58-Newthatch x No 3906			30.7	11.4	21.1*
W 240-Rescue No3961			33.9	12.4	23.2*
Frontana-Thatcher x NNo 2083-NNo 2247			33.7	12.9	23.3*
Selkirk check	13.0	15.0	31.3	9.9	17.3
Conley check	9.7	18.3	25.3	9.9	15.8
Lee check	11.8	19.3	27.8	11.9	17.7
*2 year average yields; for Selkirk, 20.6; Conley, 17.6; Lee, 19.9.					

Table 41. Summary of Fargo and Casselton data on wheats in the Advanced Station Nursery in 1959.

Row No.	Variety	Fargo Data								Casselton Data			
		Date Hd.	Height	Lodging	Black Chaff	Leaf Rust	Test Wt	Yield Bu/A.	Rank	Lodging	Test Wt.	Yield Bu/A.	Rank
			In.	1	2	%	lbs/Bu			1	lbs/bu		
1	ND 137-2	6-26	34	2	0	25	57.0	17.7	12	3	53.0	19.8	5
2	ND 138-1	-26	32	3	0	35	56.5	13.7	13	2	55.5	22.3	2
3	Pilot-Prem x Il-44-20	-30	39	2	0-4	50	55.5	23.9	5	4	53.0	24.5	1
4	Pilot-Prem x Il-40-22	-29	39	3	0	50	56.0	26.6	3	5	53.0	21.5	4
5	do.	-30	38	3	0	55	54.5	18.6	11	5	51.0	14.3	12
6	N.No.1552-Mida x H-1018-2791	7-1	39	4	0	55	56.0	21.2	7	4	56.0	14.6	11
7	do.	-1	38	4	0	50	54.5	21.2	8	4	52.0	14.3	13
8	do.	6-29	40	4	0-3	60	54.5	18.8	10	4	50.0	15.8	10
9	do.	-27	39	5	0-4	50	56.0	19.1	9	5	51.0	18.0	8
10	Fron-Th x 2083-2247	-30	39	4	0	T,40	59.5	29.4	1	4	54.5	22.2	3
11	do.	-30	38	4	0-4	T,35	58.5	26.0	4	5	53.5	17.3	9
12	do.	-29	39	3	0-2	T,30	58.0	27.1	2	5	53.0	19.3	6
13	W24-Rescue x 1924-1953	-30	38	4	1-3	25	56.5	22.3	6	5	52.0	18.7	7
	Average							22.7				18.7	

[1]Scale 0-9 (9= most severe)
[2]Scale 0-9 (9= most severe)

Table 42. Milling and Baking and Analytical Data from Fargo samples of Advanced Station Nursery Wheats. - 1959.

Variety or Number	Wheat Protein[1]	Kernel Appear-ance	Flour Yield	Milling Charac-teristics	Absorp-tion	Dough Charac-teristics[2]	Loaf Volume	Crumb Color[3]	Color[4]	Mixogram Pattern
ND 137-2 (check)	14.9	HRS*	42.3		61.2	G	200	5.5 g	S	M.strong
ND 138-1 (check)	14.4	HRS*	43.0		60.0	G	195	5.5 g	S	M.strong
Pilot-Premier x Il-44-20	13.8	HRS*	42.6		59.6	G	180	5.5 g	S	V.Weak
Pilot-Premier x Il-44-22	13.3	HRS*	45.3	e	59.6	G	180	7.0	S	Weak
Pilot-Premier x Il-44-22	13.8	HRS*	42.0	e	59.6	G	185	7.0	S	Weak
N.No 1552-Mida x H44-1018-2791	13.1	Pale	47.3	a-e	57.6	F	215[6]	7.5	P & D	Weak
N.No 1552-Mida x H44-1018-2791	13.1	Pale	44.8	a-e	57.6	F	180	7.5	P & D	M.WEak
N.No 1552-Mida x H44-1018-2791	13.2	Pale	46.3	a-e	57.6	F	180	7.5	P & D	M.Weak
N.No 1552-Mida x H44-1018-2791	13.1	Pale	44.8	a-e	57.6	F	170	7.0	P & D	M.Weak
Frontana-Thatcher x 2083-2247	14.4	HRS	44.6		59.2[5]	G	165	5.5 g	D	V.Weak
Frontana-Thatcher x 2083-2247	14.4	HRS	43.9		59.2[5]	G	165	5.5 g	D	V.Weak
Frontana-Thatcher x 2083-2247	14.1	HRS	42.3		59.2[5]	G	165	5.5 g	D	V.Weak
W240-Rescue x 1924-1953	13.5	HRS*	41.9		60.8	F	180	5.5 g	S	M.Weak

Note:

*S1. Bleached.

a Flour soft and fluffy.

b Bran difficult to clean.

[1]Expressed on 13.5% moisture basis.

[2]Dough handling qualities at panning time: G = good; F = fair.

[3]Crumb color: g = grey - Perfect score 10.0.

[4]Crust color: S = satisfactory; P = pale; D = dull.

[5]Baking doughs required a very short mixing time.

[6]Gas bubble.

Date	Meetings & Tours	Attendance
Jan. 6-9	Annual Branch Station Conference	550
Jan. 22	Red River Valley Farm Forum, Grand Forks " From Silage to Steak"	
Jan. 24	Farmers and Ranchers Day, Glendive "From Silage to Steak"	150
Jan. 25	Dickinson State Teacher's College "Tour of Livestock Projects"	30
Jan. 29	Golden Valley County Feeders Tour	125
Feb. 4	Glen Ullin K of C " Increasing our Income From Cattle"	30
Feb. 9	Harlow, County Agric. Imp. "Improving our Agriculture"	35
Feb. 10	Devils Lake, County Agri. Imp. "Improving our Agriculture"	50
Feb. 19	Fargo, Farm Managers "New findings in increasing our Income"	20
Feb. 20	Mohall, County Agri. Imp. Ass'n Winter Show "Increasing our Farm Income"	80
Feb. 25	Wibaux, County Imp. Ass'n. "Feeding our Beef Cattle"	40
March 1-4	Valley City Winter Show "Exhibited - Yorkshires"	
March 24	Vets Ag Class - Lemon " Tour of Station"	20
March 25	Dick Witz "Plans for new grain elevator"	
March 26	Wing Farmers Institute "Increasing your Income from Beef"	125
April 2	Dunn Center High School Class "Tour	5
April 6	Beach Elementary Class	7
May 19	Dr. Callenbach visited Station with Drs. Neal and Shackley of U.S.D.A.	
May 20	Dr. Whitman's class of NDAC "Toured Station"	15
May 21	School children and parents of Hettinger com. "Toured Station"	30
June16	Mr. Mead and Mr. Nygaard "Tour of Station	2
June 24	Crops Day "Tour of Station"	250
June 24	Lars Jensen " Visited Station"	
June 30	SC Service "Judging Farms"	
July 8	DSTC Conservation Class "The Future of Agriculture"	40

July 11	N.G.P.S. of A.S.R.M. "Tour"	60
July 22	South Western District 4-H Judging Contest	75
Sept. 10	State meeting Crop Ins. "Our place in N.D. Agriculture"	98
Sept. 25	McKenzie County "Judging County 4-H Fair"	50
Sept. 28	Dickinson SCS Meeting "The SCS program"	
Sept. 28	Turtle Lake "Wintering Cows on low level rations"	75
Sept. 28	Wilton "Wintering Cows on low level rations"	75
Oct. 5	Dickinson Garden Club "The Fruit Garden"	20
Oct. 21	Annual Swine Day "N.D.A.C."	50
Oct. 26	Annual meeting Oliver Co. Livestock Ass'n. "Low Level Rations"	40
Nov. 4	Agriculture Committee "Chamber of Commerce"	10
Nov. 6	Church and Agriculture Institute "Keeping our youth in North Dakota"	38
Nov. 12	State SCS meeting, Minot "Livestock and Conservation"	200
Nov. 9	Career Day "Dickinson High School"	
Nov. 16	Mott Business Men "Judge Livestock"	
Dec. 2	Glen Ullin K of C "Wintering Beef Cows"	88
Dec. 4	Carson Grant Co. Improvement Ass'n. "Keeping up our Livestock"	16
Dec. 9	Livestock Research Roundup	1100
Dec. 15	Burleigh County Livestock Ass'n. Tour	200
	Total	3799

Precipitation	Seasonal	Annual	From 1892 - 1958		1958
	April - July			Average	
1952	6.07	11.97	Jan.	.45	.13
1953	13.44	19.39	Feb.	.44	1.01
1954	5.59	16.33	Mar.	.76	.16
1955	10.14	14.65	Apr.	1.27	.57
1956	7.30	12.70	May	2.20	.45
1957	14.76	22.15	June	3.51	3.26
1958	8.14	12.18	July	2.21	3.86
1954 - Greatest	21.20	31.16	Aug.	1.79	.57
1936 - Least	2.03	6.72	Sept.	1.16	.06
			Oct.	.88	.65
67 year average	9.19	15.63	Nov.	.55	1.35
			Dec.	.41	.11

Date	Group	Subject	Attendance
January 26	Hettinger County Farm & Ranch	Grass & Corn	25
January 27	Slope Co. Crop Imp. Assn.	Grain varieties	50
February 21	Seed Dealers Meeting, Dickinson	Attended	
February 25	Hettinger County Livestock Assn.	Grain & Fert. use	40
February 26	Adams County Livestock Assn.	Grain & Fert. use	25
March 4	Valley City Winter Show	Grain judging	
March 19	Regent Farmers Institute	Grain variety tr.	30
March 19	New England Farmers Institute	Grain variety tr.	20
March 26	Taylor Farmers Institute	Grain variety tr.	50
March 24	Vet. Agr. Class, Lemon, S.D.	Tour of DES	20
April 2	Dunn Center High School Class	Tour of DES	5
April 6	Beach Elementary class	Tour of DES	7
May 20	R. & P.M. Class from NDAC	Tour of DES	15
May 21	Hettinger Community Tour	Tour of DES	30
May 25	Vo. Agr. Class Harvey, N.D.	Tour of DES	40
June 24	Annual Crops Field Day	Tour of DES	250
June 30	Judging Western district SCS farm	Tour of DES	4
July 8	DSTC Conservation Class	Farming systems in N.D.	40
July 24	Langdon substation	50^{th} Anniversary Attended	Attended
September 5	Richardton 4-H Ach. Days	Judging exhibits	
September 11	Beach 4-H Achievement Days	Judging exhibits	
September 12	Hebron 4-H Ach. Days	Judging exhibits	
September 12	Belfield 4-H Ach. Days	Judging exhibits	
September 18	Dickinson 4-H Ach. Days	Judging exhibits	
September 19	Killdeer 4-H Ach. Days	Judging exhibits	

October 21	Annual Swine Day NDAC	attended	
October 26	Area IV SCS Supervision Annual meeting		
November 12	Farmers meeting, Bowman	Corn & silage	35
November 26	Farmers meeting, Dickinson	Corn & silage	20
December 9	Livestock Research Roundup	Roughage work at DES	1100

RADIO AND TV PROGRAMS

We have a regular weekly radio broadcast and a monthly TV program in cooperation with the County Extension Agent. The following is a list of my radio programs and TV programs from January 1, 1959 to December 31, 1959.

Radio Programs

Date	Radio Programs
January 29, 1959	Handling and Feeding for Market
February 26, 1959	Roughage for Beef Cattle
March 5, 1959	Getting Little Pigs Started
April 30, 1959	Plan Cattle Feed Ahead
May 21, 1959	Crops' Day, June 24
June 18, 1959	Dickinson Experiment Crops Day
July 16, 1959	Summer Handling of Cattle
August 13, 1959	Wintering Beef Cows
September 17, 1959	Wintering Cows on low level Rations
October 22, 1959	Cattle Feeding
November 9, 11, 16, 23, 30	Livestock Research Roundup

TV Programs

March 2, 1959	Cost of Producing Beef
April 20, 1959	Cost of Feeding and Pasturing Yearlings
August 17, 1959	Low Level Rations for Beef Cows