

30 Years of Trials Convince Us That

No Winter Wheat Now Available Can Succeed In Dickinson Area

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The 1954-55 variety trial with winter wheat at the Dickinson Experiment Station was completely winterkilled, while winter rye in adjacent seedings survived the winter with fairly good stands.

In general, winter wheat has not been dependable in this area. The amount of winter wheat grown in North Dakota is relatively small, but because the greater portion of the winter wheat acreage has been grown in the Slope region it has received considerable attention at the Dickinson Station.

Many different methods of protection have been tried over the years without success, such as covering with straw, sowing in furrows in grain or corn stubble or in standing corn. Different methods of packing the soil have been tried, as well as different rates and dates of seeding. None of the cultural methods tried could offset the handicap of dry soil conditions usually prevailing in the fall, and the severity of winter weather in this area.

At best the winter wheat is likely to winter kill enough to cause a thin stand, permitting a rank growth of weeds and resulting in poor yields.

Mr. T. E. Stoa, agronomist and chief of the division of plant industry of the North Dakota Experiment Station, points out that winter wheat production is uncertain in other sections of the state, as well as in the Dickinson area. Winter survival varies from year to year and from one area to another, depending on condition of the crop, moisture, temperatures and other factors. More frequently than not, spring survival is poor or only fair. Winter wheat available not only lacks winter hardiness for North Dakota, but also is susceptible to the various rusts which now prevail.

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TABLE I.—Comparison of Winter Wheat and Spring Wheat yields in Dickinson Experiment Station trials since 1925.

Year	Spring Wheat		Winter Wheat	
	Marquis	bu. per acre	Turkey	bu. per acre
1926		6.2		7.2
1927		18.2		17.6
1928		24.2		33.8
1929		9.1		11.3
1930		15.3		10.5
1931		5.0		0.0
1932		19.5		23.8
1933		9.2		7.5
1934		2.8		0.0
1935		10.0		.5
1936		0.2		0.0
1937		7.8		0.0
1938	Thatcher	4.8	Yogo	3.4
1939		26.8		15.6
1940		8.2		1.7
1941		7.6		6.3
1942		24.0		31.8
1943		21.5		0.0
1944		20.2		14.9
1945		20.0		0.0
1946		16.3		0.0
1947		26.2		0.0
1948		33.0		0.0
1949		10.8		0.0
1950		18.2		0.0
1951		23.8		0.0
1952		12.5		0.0
1953		16.6		0.0
1954		9.9		12.6
Total		1275.0	Total	1122.0
Av. Yield		10.7	Av. Yield	9.4
Grand Total		4279.0	Grand Total	1985.0
Av. All Spring Wheat		14.8bpa	Av. All Winter Wheat	6.8bpa

30-Years Summary of Winter Wheat Trials at the Dickinson Experiment Station

1926

On August 28, 1925, eight varieties of winter wheat were sown. Because of dry weather in September and cold weather in October, only part of the seed germinated in the fall and little growth was made before winter.

The snowfall in December was slightly above normal but during the remainder of winter there was little snow to afford protection to the wheat. Stand counts made in May showed that while the stand was very thin, more plants were alive than when counted the previous fall. The delayed germination until spring of part of the seed thus prevented obtaining a reliable measure of the relative amount of winter killing of different varieties.

1927

On August 21, 1926, eight varieties of winter wheat were drilled in duplicate plots of standing corn. Because of dry soil conditions growth in the fall was not vigorous. The snow supplied ample winter protection from

the last week in November until March. The percentage of winter survival varied from 64% to 80%.

1928

On September 6, 1927, twelve varieties of winter wheat were drilled in 40th acre plots of standing corn stalks. Dry weather in the fall prevented a vigorous growth before winter set in. From about the middle of November until the middle of March the grain was well protected by a deep covering of snow, the moisture from which kept the ground moist until May. In this respect the winter wheat plots had the advantage over the spring wheat varieties sown in corn stubble.

The latter, however, probably received more benefit from summer rains, because the winter wheat was more nearly mature when the rainy season set in. The amount of winter killing in the winter wheat was somewhat less than usual. The winter wheat yields were obtained at the expense of considerable loss in the feeding value of the corn stover, the pasturing of which would have injured the wheat in the fall.

1929

On September 14, 1928, ten varieties of winter wheat were drilled in duplicate 40th acre plots in standing corn. Due to extremely dry soil conditions only a part of the seed germinated in the fall. This stand was injured by grasshoppers and later destroyed by winter killing. The remaining seed that germinated in April produced less than half a stand.

The corn stalks held a large amount of snow which remained comparatively late in the spring. The resulting soil moisture supplemented by the June rains enabled the winter wheat varieties to produce yields somewhat higher than the spring varieties, sown in corn stubble. The yields in 1929 do not reflect differences in winter hardiness since most of the plants emerged in the spring. The winter varieties headed at about the same time as mid-season varieties of spring wheat but ripened nearly a week later.

1930

On September 7, 1929, ten varieties of winter wheat were drilled in 56th acre plots in flax stubble. The varieties emerged October 8 with fairly good stands. Due to sufficient moisture in fall and early spring and to a heavy snow cover throughout the winter, the varieties came through the winter with unusually high percentages of survival.

1931

On September 10, 1930, ten varieties of winter wheat were drilled in 56th acre plots in grain stubble. Because of dry soil conditions seed germination was not uniform and only a weak growth was made in the fall. Winter survival was good because of the mildness of the winter but severe drought in the spring together with some injury from army cutworms caused the crop to be almost a complete failure, not worth harvesting.

1932

On September 14, 1931, ten varieties of winter wheat were drilled in duplicate 40th acre plots in standing corn, and emerged Sept. 28 with good stands. Moisture conditions were favorable and a vigorous growth was made before winter set in. In the spring moisture conditions again were favorable so that winter killing was slight.

1933

On September 21, 1932, ten varieties of winter wheat were seeded in standing corn. Seeding was delayed because of the prevalence of grasshoppers. Because of dry soil conditions, emergence was delayed until October 16. The germinating grain was covered with nearly a foot of snow in the record breaking blizzard Oct. 19.

On only a portion of the wheat field did the snow disappear before winter, thus enabling the wheat to grow and become better established

before permanent winter weather in November put an end to further growth. The wheat on this portion of the field survived the winter with about half of a normal stand. On the remainder of the field the wheat was too thin to save for harvest. Moisture conditions were good in early spring, but drought and hot weather in summer reduced the yields.

1934

In the fall of 1933, ten varieties of winter wheat were drilled in duplicate field plots in standing corn and 114 varieties were seeded in triplicated three-row plots in grain stubble. Because of dry soil conditions germination did not begin until after the middle of October. The grain was almost ready to emerge when permanent winter weather put an end to further growth. A thin stand emerged about April 1, but subsequent growth was weak because of lack of soil moisture. Because of the thin stand and the growth of weeds in both field plots and nursery the crop was not considered worth saving for harvest.

1935

Ten varieties of winter wheat were drilled in duplicate field plots in standing corn and 114 varieties and strains were drilled in grain stubble in triplicated three-row plots in the fall of 1934. Because of extremely dry soil conditions, germination was delayed until October. The stand in field plots and nursery was thin and irregular and the plants were small and weak when winter began. The percentage of winter survival and the grain yields were very low.

1936

In the fall of 1935, ten varieties of winter wheat were drilled in duplicate field plots in standing corn and 120 varieties and strains were drilled in grain stubble in triplicated three-row plots. Because of extremely dry soil conditions none of the wheat emerged in the fall. Moisture from melting snow caused the wheat to start germinating sometime in March. Growth was suspended during a spell of below-zero weather around the first of April.

Emergence took place about April 7. Evidently the severe cold in early April injured the sprouting wheat in the nursery as only a few scattering plants emerged in each row. These were further injured by the drought and later were plowed up to control weeds. A thin stand emerged in the field plots. Because of the heat and drought the resulting crop was practically a failure but was cut and threshed to save the seed.

1937

About the middle of September, 1935, eleven varieties of winter wheat were seeded in duplicate field plots and 240 strains in nursery rows. The field plot varieties were drilled with a furrow drill on corn land but the stand of corn was too thin and short to afford the usual winter protection. The soil was so dry that very few plants germinated in fall.

A thin stand emerged early in April but subsequent weather was so dry that the land was duckfooted to control the weeds. Because of extremely dry soil conditions none of the nursery varieties emerged in the fall, although germination began in a small percentage of the seeds. A very thin stand emerged in the spring but was not sufficient to save for harvest.

1938

Early in September, 1937, eleven varieties of winter wheat were seeded in duplicate field plots in standing corn and 125 varieties and strains in nursery rows. Drought and grasshoppers interfered with the fall growth. The stand in the spring was thin in field plots but the grain was allowed to mature. In the nursery only a very few plants were alive in the spring, the stand in the uniform nursery averaging only one plant per 16 feet. The ground was duckfooted to prevent the growth of weeds.



FIGURE 1.—*Winter wheat plots nearly bare on the left contrasted with winter rye plots on the right.—Photo by Larkin Langford, May, 1955, Dickinson Experiment Station.*

1939

Ten varieties of winter wheat were drilled in duplicate field plots in standing corn on September 16, 1938. Because of dry soil conditions only about 10% of a normal stand had emerged by October 31. Enough plants finally emerged to make about half of a normal stand. The nursery varieties were seeded September 10 between rows of grain stubble and emerged about October 26. The heavy snowfall of November melted about the last of that month so that the surface soil was well moistened when permanent winter weather arrived in December. Soil moisture conditions were fairly good in the spring and the nursery came through the winter with an average survival of about 50% despite the fact that the fall growth was not over an inch in height.

1940

The varieties of winter wheat in field plots were drilled between rows of standing corn on September 15, 1939. Because of the very dry soil the seed failed to germinate in the fall and emergence did not occur until about May 1 after the ground was soaked with liberal April rains. In all varieties there was somewhat less than half a stand.

Following good rains early in August, 63 varieties of winter wheat were seeded in the nursery on August 10 and 11. These emerged about August 18, with fairly good stands and a vigorous early growth was made until a lack of moisture during an extremely dry fall caused the plants to dry out and weaken before winter set in. There was but little snow protection during most of the winter and the stand was thin and irregular when spring arrived.

1941

Ten varieties of winter wheat were drilled in duplicate plots in standing corn on September 12, 1940, and emerged about September 30, after liberal rains had fallen. Good rains again in October soaked the soil and the wheat grew vigorously until snow and colder weather in November put an end to further growth. Although the snow protection throughout the winter was very light, moisture conditions in the spring were good and the wheat came through the winter with much better than average survival, averaging about 70% in the uniform nursery and 85% in the field plots.

1942

The field plots were seeded September 19, 1941, in duplicate plots in corn stubble. Because of cold wet weather emergence was delayed until October 3. Good stands resulted and a short but vigorous growth was attained before winter began. The ground was unusually wet when freeze-up occurred and after it thawed out in the spring, so that grain did not suffer from drought in the fall, spring or summer. The winter was not severe but there was little protection for the wheat during the below-zero weather.

The percentage of winter survival was high, averaging 88%. The average survival for the winter wheat plots in the previous year was 85% when moisture conditions were similar to those affecting the 1942 crop. The high survival for the two years gives weight to the belief that survival of winter wheat here is affected as much by moisture conditions in the fall and spring as by the severity of winter.

1943

Ten varieties of winter wheat were seeded in duplicate field plots in sorghum stubble and thirty varieties were seeded in triplicate three-row plots in nursery rows. Seeding was delayed until the latter part of September because of the prevalence of grasshoppers. Being favored by moist soil conditions a good growth was made before winter began. However, severe winter killing occurred. When stand counts were made in May, it was found that in the uniform winter hardiness nursery the average winter survival was less than 2%. Similar conditions were found in the field plots so that the crop was not saved for harvest.

1944

Field plots were seeded on September 13, 1943, in corn stubble and 30 varieties were seeded in triplicate 3-row nursery plots in grain stubble. Because of extremely dry weather in the fall, only part of the seed emerged then and the remainder in the spring. The fall growth was weak and the stand after spring emergence was rather thin.

1945

In September, 1944, nine varieties of winter wheat were seeded in duplicate field plots and 37 varieties were seeded in triplicate nursery rows. Grasshoppers injured the stand in the field plots severely and as a result few plants were still alive when winter began and still fewer survived the winter. The crop was not saved for harvest. In the winter wheat nursery seeded on fallow, germination was prompt and growth vigorous. A good stand was present when covered with about a foot of snow on November 1. When the snow disappeared about March 10, the wheat was mostly still green and a fair survival was expected. When stand counts were finally made in May, however, it was found that the winter survival of the 30 uniform varieties averaged only 10%. The crop was not saved for harvest.

1946

In September, 1945, nine varieties of winter wheat were seeded in duplicate field plots in corn stubble and 30 varieties in uniform winter hardiness nursery were drilled between 12-inch rows of oat stubble. Germination was slow and uneven and subsequent growth was injured somewhat by grasshoppers. The stand was very thin both in the fall and in the spring. The average winter survival for the nine varieties was estimated at about 36%. The crop was plowed up to control the growth of weeds. In the nursery the stand was thin and eaten down by grasshoppers and also greatly retarded by drought in the winter and spring. Stand counts in the spring showed an average stand of about 12%. The stand in the nursery was considered too thin to save and the land was cultivated to keep down the weeds.

1947

The work with winter wheat in 1947 was limited to the winter hardiness nursery of 31 varieties seeded in triplicate three-row nursery plots in oats stubble early in September of 1946. The dryness of the soil prevented germination until October when moisture from a big snow had melted. There was not time or much growth before permanent winter weather put an end to growth for the season. Survival counts in the spring showed only a few plants alive.

1948

The work with winter wheat in 1948, was limited to the winter hardiness nursery of 30 entries seeded in September of 1947. Dry weather and dry soil conditions delayed germination and what few kernels had sprouted had not emerged at the beginning of winter. Survival counts made in the spring showed practically 100% winter killing.

1949

Work with winter wheat in 1949 was confined to the uniform winter hardiness nursery of 30 varieties and selections seeded on September 27, 1948. Dry soil conditions delayed germination and only a few plants emerged before permanent winter weather put an end to the growing season. Stand counts made in the spring of 1949, showed Yogo, Iohardi, and Minter to have the highest percentage of survival, each averaging 18%.

1950

The uniform winter hardiness nursery of 27 varieties and strains and the supplementary winter hardiness nursery of 100 strains were seeded in the winter hardiness trials at this station in the fall of 1949. Zero survival was recorded for both of the winter hardiness nurseries seeded at this station for the season 1949-1950.

1951

Winter wheat trials which included a varietal field plot test of three varieties and winter hardiness nurseries of approximately 150 varieties, strains and selections were seeded early in October, 1950, and had emerged in less than two weeks. Reasonably good precipitation in the fall of 1950 resulted in a rapid growth and most entries had reached a height of over two inches before freezing weather ended the growing season. All entries in this trial winter-killed one hundred per cent.

1952

In the 1952 trials, a Kharkof selection averaged 20% survival followed by the original Kharkof with 11% and Minter with 9% survival; 5% of a Turkey x Oro cross survived at Dickinson and 4% of the variety Minter survived. The rest of the entries in both the uniform winter hardiness nursery and the supplemented winter hardiness nursery survived less than 3% with the majority of the entries killing out entirely.

1953

Average survival of entries in the uniform winter hardiness nursery varied from a high of 39% to a low of 13%. Stands of Minter and Yogo were recorded as 33% and 13% respectively.

1954

Trials with winter wheat at the Dickinson station for the 1953-54 season included the uniform hard winter wheat hardiness nursery of 19 entries and the supplementary winter hardiness nursery of 146 entries. Yields in the uniform planting ranged from 13.7 bushels per acre to 4.9 bushels per acre. Highest test weight was 51 pounds per bushel. The crop was badly rusted, as indicated by the light test weights, and yields were considerably lower than spring wheat yields. Spring survival counts showed less winter-killing than had been the case at Dickinson for many years.