

A Brief History of Wheat Variety Changes on Farms in North Dakota

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Red Fife, also called "Scotch Fife," was the most commonly grown wheat in North Dakota beginning with the agricultural development of the State. It continued to be the predominant variety for some time after Bluestem was introduced in the early 90's. North Dakota's reputation for the production of the best quality "No. 1 Hard" wheat was made with Red Fife wheat. This wheat was introduced in the United States from Canada, coming into Canada in 1842 by way of Germany and Scotland. It is presumed to have originally come into German ports and Germany from Galicia. Red Fife gets its name from David Fife, Ontario, who received and grew the first small sample and did much to preserve this early introduction and popularize its use in eastern Canada.

There were many early attempts to improve this wheat by early experiment station workers and private growers. N. Dak. 313 and Minn. 163 (Glyndon) were recognized experiment station selections grown extensively in those early years. Several farmers purified and improved their fife wheat by systematic selection. The increase of these strains when distributed often came to be identified with the name of the man responsible for the selection and its distribution. Some of the farmers who were most active in this early improvement were: J. B. Power, Power, N. Dak.; James Holes, Fargo, N. Dak.; J. C. McKendry, Fargo, N. Dak.; Jens Rysting, Mayville, N. Dak.; Chas. McKissick, Mayville, N. Dak.; and D. L. Wellman, Frazee, Minn.

Bluestem wheat was introduced in the early 90's. L. H. Haynes, Fargo, had a considerable part in the early improvement and distribution of this wheat. Minn. 169 from the Minnesota Experiment Station, and N. Dak. 316 from the North Dakota Experiment Station

were bluestem selections that came to be widely grown in the early part of the century. "Bolton's Bluestem," selected by Thomas Bolton, Park River, and "Davis Bluestem" selected by G. E. Davis, Buxton, were other strains. Bluestem was a later ripening variety than Red Fife and very satisfactory when growing conditions were good. It appears to have been grown more extensively than fife soon after the turn of the century. Both fife and bluestem were seriously lacking in resistance to stem rust.

Experiment stations tested many varieties or strains of wheat during these early years, obtaining seed from many states, U. S. Department of Agriculture, Canadian provinces, seed companies and from farmers who may have brought seed from their native land. Varieties from other countries, particularly European Russia, where climatic conditions are somewhat the same as ours, were also introduced and tested in attempting to find those better suited to our northern conditions. Very

few of these, however, proved superior or came into general farm use in North Dakota.

Preston, more popularly known as "Velvet Chaff" and sometimes as "Bearded Fife," was introduced from Canada about 1895. This variety was from a cross between a Siberian wheat and Red Fife made by Dr. William Saunders and associates, Central Experimental Farm, Ottawa. Preston came into more general production after about 1905, and continued to increase for a number of years, representing in 1919 about three-fourths million acres in the State. Preston did not have a particularly high yielding capacity but ripened a little earlier and showed a little more rust tolerance than other wheats then grown. A tendency to shatter when ripe, a lower quality of gluten, and a less market appeal were factors which discouraged its more extensive use.

Introduction of Durum Wheat

The introduction and establishment of durum wheat can be considered a step of major importance in North Dakota wheat production. Durum was first grown in the late 90's and farm production increased soon after 1900. Early durum wheats were sometimes called "Goose" or "Goose Wheat." Durum varieties grown were principally of Russian origin. Arnautka was grown most extensively during the early years. T. I. Oium, Lisbon, was one of the early growers. Kubanka, Gharnovka, Black Don, and Velvet Don were other varieties in production. The U. S. Department of Agriculture and the North Dakota Experiment Station were active in the introduction and early increase of durum wheat, demonstrating its qualities for the making of macaroni products, aiding in establishing new industries and new markets.

When durum was first introduced it was thought that this wheat might be better suited than hard red spring wheat to the drier conditions of western North Dakota.

This did not prove to be the case and durum later came to be grown most successfully in eastern North Dakota, outside the Red River Valley. An appreciation of the importance of durum to the wheat growers of North Dakota may be realized when one considers that since about 1917 from about 20 to 40 percent of the North Dakota wheat acreage has been given annually to the production of this crop. From two-thirds to more than three-fourths of the durum wheat usually produced in the United States is grown in North Dakota.

There have been some important changes in the varieties of durum grown since the early years. After the rust years of 1916 and 1919, Kubanka replaced much of the Arnautka acreage. Kubanka is still grown to some extent. A strain of Kubanka called K-75 has been grown extensively in the northern part of the State. Acme introduced by the South Dakota Experiment Station, Monad (D-1) and Red durum (D-5, also called Pentad), introduced about 1911 by H. L. Bolley of the North Dakota Experiment Station, were selections distinctly resistant to stem rust. These came into considerable use after the rust years of 1916 and 1919. Nodak, a rust resistant selection from Kubanka by the Dickinson Substation was released in 1923. Unfortunately these more rust resistant varieties were less satisfactory for making high quality macaroni products, therefore, were not so well received on the market. Algerian varieties—Kahla ("Black Chaff") and Peliss, introduced by the U. S. Department of Agriculture from northern Africa and Golden Ball ("Solid Stem," "Viking") from South Africa, have from time to time been grown in some communities, but never became generally popular. Mindum, a variety of amber durum released by the Minnesota Experiment Station about 1917, came into general production a few years later, and for some time has been the variety most extensively grown in North

Dakota. Mindum is only moderately resistant to rust, but an excellent yielder and ranks high in macaroni quality.

Early Work in Plant Improvement

Early work in wheat improvement was mainly thru plant selection, sorting out, testing and increasing superior lines. W. M. Hays of Minnesota and later of the North Dakota Experiment Station, did some early crossing but this was largely limited to crosses between strains of fife and bluestem. J. H. Shepperd of North Dakota, Andrew Boss of Minnesota, William Saunders and later Chas. E. Saunders, of the Central Experiment Station, Ottawa, were others active in this early wheat improvement.

Marquis

After the early introduction and establishment of durum production the next contribution of major importance to wheat growers in North Dakota was the introduction of Marquis wheat. This variety was developed by Dr. Chas. E. Saunders, Ottawa, as a selection from a cross between an early ripening Indian wheat, Hard Red Calcutta and Common Red Fife. It was selected in 1903 for its earliness over Red Fife and was released in Canada in 1909. It first came into limited farm production in North Dakota in 1912.

Marquis had many characteristics of its fife parent, though ripening earlier. This shorter growing season, which permitted it to "escape" heat and rust injury better, was one of the advantages which it had over Red Fife. With serious losses due to rust occurring in North Dakota in 1914 and 1916, the older fife and bluestem varieties were discontinued in many communities in favor of this earlier ripening Marquis. By 1919 Marquis was grown on about $4\frac{1}{4}$ million acres in North Dakota, representing about two-thirds of the then hard red spring wheat acreage in the State.

Marquis is not resistant to stem rust and its earliness, compared with Red Fife and Bluestem, alone could or did not solve the rust problem. Since there were no better varieties of hard red spring wheat available, however, Marquis continued to be the predominant variety for several years, and particularly so in western North Dakota where rust injury was less frequent.

As rust years and serious losses continued with increasing frequency there developed an increasing demand for, and interest in, new varieties. With this demand came the development, introduction and promotion of many new varieties. Usually these were not resistant to rust nor superior to Marquis under our conditions. Several, however, were earlier ripening sorts, and this sometimes gave them a better chance to escape damage. Some of the varieties which came to be grown to a more or less extent for a time about 1920 and soon after, especially in the eastern part of the State were: Ruby, Prelude, Kitchener, Quality, Red Bobs, and Early Triumph. Varieties coming into limited production after about 1925 included Supreme, Progress, Axminster, Garnet, Reward, Broatch's Brownhead (Montana King), Whiteman and Marvel. Of these Reward proved to be the most satisfactory and, while lacking in resistance to rust, usually yielded well, producing grain of high test weight and pleasing appearance. In 1934 Reward was grown on about 2 percent of the hard red spring wheat acreage in North Dakota.

Modern Plant Breeding

Modern plant breeding and variety improvement, as recognized and practiced today, began to develop after 1910, in North Dakota about 1915. Creating superior rust resistant varieties by crossing two or more varieties made slow progress for several years because resistant lines which might be successfully used as parents were relatively unknown. Three contribu-

tions to variety improvement which came about soon after 1915 were of distinct importance. The North Dakota Experiment Station selected and introduced Kota, the first stem rust resistant hard red spring wheat then known. H. K. Hayes and associates of the Minnesota Experiment Station in 1914 successfully crossed Marquis wheat and a rust resistant durum called Iumillo. Out of this cross was selected in 1918 a rust resistant hard red spring wheat, later named Marquillo. E. S. McFadden in South Dakota in 1915 successfully crossed Marquis with the highly rust resistant emmer ("speltz") and out of this cross selected in 1923 a highly resistant line, later named Hope.

It is not important that no one of these early rust resistant wheats ever came into extensive farm production. The thing that is important is that these new lines of hard red spring wheat, together with other selections from the same crosses, did greatly increase the choice and variety of breeding material which, having rust resistance, could now be readily used by the plant breeder for further crossing and with the larger assurance of success. Nearly all new varieties which have since come into production, or promising selections now in experimental tests, have some relationship to one or more of these original rust resistant lines.

Ceres

Ceres, developed by L. R. Waldron of the North Dakota Experiment Station from a cross made in 1918 between Marquis and Kota, was first distributed in 1925. Ceres when released and compared with Marquis, the variety then most commonly grown, was considered as moderately resistant to stem rust. It proved superior to Marquis, not only in resisting rust but in ability to yield well under drouth and other severe conditions. As a result Ceres production increased rapidly during the next few years and by 1934 represented about 45 percent of the hard red

spring wheat acreage in North Dakota, with a further increase in 1935. Since 1935 Ceres has to a large extent given way to Thatcher, a variety more resistant to stem rust.

Hope was distributed first in 1927. It proved to be very satisfactory in rust resistance, but lacked capacity to yield under unfavorable drouth or heat conditions and never came into extensive farm use. It is still recognized, however, as one of the most resistant varieties available and is extensively used by plant breeders to transmit its type of rust resistance to new hybrids.

Marquillo, developed by the Minnesota Experiment Station came into farm production in North Dakota about 1928. This variety had considerable resistance to rust and was therefore, superior to Marquis in areas where rust occurred frequently. Marquillo lacked some in flour quality and capacity to yield under a wide range of conditions and so did not come into extensive production in North Dakota.

Thatcher

Thatcher, developed by the Minnesota Experiment Station from a double cross, (Marquis x Iumillo) x (Marquis x Kanred), made in 1921 and selected in 1925, was released to Minnesota farmers in 1934. Thatcher was more satisfactory than Marquillo, had good resistance to stem rust, yielded more consistently and the grain was of high flour quality. A weakness in Thatcher was lack of resistance to leaf rust. Thatcher became extensively grown after the rust years of 1935, 1937 and 1938, when unusual rust conditions seriously damaged Ceres. Thatcher was grown more extensively than any other wheat in North Dakota by 1941, occupying about 60 percent of the hard red spring wheat acreage in the State.

Following the rust years of 1935, a number of other new varieties were brought out. These are all re-

sistant to stem rust and by the standards for comparison available 20 years ago, when Marquis was the variety most commonly grown, would have been assured of extensive production. Renown and Regent are selections from a cross between Reward and H-44, made at the Dominion Rust Research Laboratory, Winnipeg. Apex was developed at the University of Saskatchewan and released in 1937. "Nordhougen" was distributed by Carl Nordhougen, Leeds, N. Dak., Coronation and Brandon 123 (also in production under the name "Great Northern" and "Newmarq") are other varieties introduced in the late thirties but have never been grown extensively.

Rival and Pilot

The North Dakota Experiment Station released two new rust resistant varieties in 1939, Rival [Ceres x (Hope x Florence)] and Pilot (Hope x Ceres), the latter variety developed in cooperation with the U. S. Department of Agriculture. These two varieties class as moderately resistant to stem rust, also to leaf rust, and are excellent yielding varieties. Following the serious leaf rust epidemic in 1941, and injury to Thatcher, the acreage sown to these more leaf rust resistant wheats, and particularly Rival, increased rapidly. Vesta, a high yielding sister selection of Rival, with high resistance to stem rust but not to leaf rust, was released in 1942 for use in western North Dakota.

In 1944 another new variety, Mida, was released by the North Dakota Experiment Station. Mida is superior to Rival, Pilot and Vesta in a number of important plant characters and in the years ahead may come to be sown on much of the acreage now sown to these varieties.

Two varieties of amber durum, Carleton [(Emmer x Mindum) x Mindum²] and Stewart [(Mindum x Emmer) x Mindum²] developed cooperatively by the North Dakota Agricultural Experiment Station

and the U. S. Department of Agriculture, were leased in 1943. These varieties, bred and selected for resistance to stem rust and back crossed twice with Mindum to recover macaroni quality, are superior to Mindum in rust resistance and equal to Mindum in macaroni quality.

Summary

And so—North Dakota's wheats have passed in review. Beginning in the early years with Red Fife, supplementing this with Bluestem and both of these largely replaced later by Marquis and a considerable acreage of durum wheat. Marquis in time was replaced by Ceres, especially in eastern and central North Dakota, and an expanding acreage of durum, especially in the rust area in eastern North Dakota. Reward came into considerable production in northeastern North Dakota.

Thatcher followed later, replacing Ceres and Reward in eastern and central North Dakota and to a considerable extent elsewhere, as well as taking over much of the remaining Marquis acreage. Renown, Regent, Rival, Pilot and Vesta then followed, taking over a considerable proportion of the Thatcher acreage. In 1944 the North Dakota wheat acreage sown, according to a survey by the Bureau of Agric. Economics, U.S.D.A., was about 82 percent hard red spring and 18 percent durum. The estimated percentage of hard red spring acreage sown to the leading varieties were: Thatcher 32 percent; Rival 31 percent; Regent 12 percent; Pilot 8 percent; Renown 6 percent; and Vesta 4 percent.

Thus the wheat variety picture in North Dakota has changed significantly over the 60 years and especially so in the last 20 years. More than 90 percent of the record 1944 North Dakota wheat crop was produced by varieties which have come into farm production within the last 10 years. It is likely to change even more rapidly in the future, but with a larger choice of

good varieties it is doubtful if any one variety will predominate to the extent that Marquis did at one time, followed by Ceres and then by Thatcher. Winter wheats have not been grown with much success in North Dakota.

INFECTIOUS EQUINE ENCEPHALOMYELITIS IN NORTH DAKOTA IN 1944

One hundred twenty six horses and mules were affected by infectious equine encephalomyelitis in North Dakota in 1944 of which 43 died. The total horse and mule population was estimated at 167,948 hence the cases of this disease amounted to 0.7 cases per 1000 horses and mules. Thirty-four percent of those affected died. The first case was reported in June and the last case in September.

Counties reporting five or more cases per 1000 equine animals were Williams, Pierce, Cavalier, Nelson and Grand Forks. Counties reporting less than 1 case per 1000 equines were McKenzie, Mountrail, Ward, McHenry, Benson, Wells, Eddy, Cass, Richland, Dickey, Morton, Grant, and Emmons.

There were 19,590 cases in the United States in some 33 states. The frequency with which the disease occurred in animals not vaccinated was 14 times greater than in the case of animals vaccinated—for the United States only 0.2 per 1000 for vaccinated animals and 2.9 per 1000 for unvaccinated animals. (From "Report on Infectious Equine Encephalomyelitis in the United States in 1944," by A. W. Miller, Chief, Bureau of Animal Industry, U.S. D.A., May 19, 1945.—Abstracted by H.L.W.)