

## Durum Wheat Acreages in North Dakota and Price Relationships

By  
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Agricultural data from the 1945 federal census with respect to North and South Dakota have recently been made available as volume I part II from the Bureau of the Census. As this report covers 74 large pages printed in small type the amount of information is both extensive and detailed. Crops are reported as of 1944 for each county with respect to number of farms reporting, acres in production of the crop, the quantity produced, and the money value of the crop. For purposes of comparison similar data are given from the 1940 census.

The cash value of the threshed small grains for North Dakota of the 1944 crop was \$332 million with 64 percent of this total produced by the wheat crop, followed by barley in second place with oats ranking third in money value. The winter wheat crop holds a very minor place in North Dakota, with common spring wheat and durum wheat of major importance. Of these two classes of wheat the hard red spring leads in importance and this has been true for each previous census year. The present census report shows a marked decline in the durum acreage during the last 5-year period and this will be discussed later. When durum wheat was first introduced by the U. S. Department of Agriculture it was believed its highest value would be in the dryer areas of the state because of its presumed greater drought resistance, compared with the hard red spring wheats. This experiment station distributed 338 bushels of durum during the three years 1902 to 1904 to farmers generally over the state except west of the Missouri River. Seed was later brought into this more western region and grown there in a limited way.

Yield trials were early undertaken at the various experiment stations in the state in a comparison between common and durum wheat. Results from such experiments have been published from time to time. An interesting table of the available comparisons from 1919 to 1931 appeared in experiment station Circular 46 by T. E. Stoa, published in 1932. A portion of this table is shown herewith.

Plant Breeder

**Table 1.—Comparable average yields of Marquis and Kubanka at seven experiment stations in North Dakota for a total of 73 station years previous to 1932. (Numbers in parentheses are numbers of years of test at each station.) Bushels per acre.**

	Fargo (13)	Edge- ley (8)	Lang- don (11)	Dick- inson (13)	Man- dan (13)	Het- tinger (5)	Willis- ton (10)
Marquis .....	26.3	13.3	20.7	14.9	13.3	24.2	22.4
Kubanka .....	29.6	17.0	26.5	16.3	13.6	22.0	21.6

For three of the stations the experiment covered the years 1919 to 1931 while for the other four stations the years of trial differed. For the three eastern stations Kubanka exceeded Marquis in yield by 4.3 b.p.a. while for the four western stations the yields of the two varieties were the same at 17.4 b.p.a. The marked differences in yield at Edgeley, Fargo and Langdon between the two varieties were evidently due mainly to difference in resistance to stem rust. While Kubanka is known to be more resistant than Marquis it suffered severely during heavy epidemics as in 1919 and 1922 for during those two years the yield of Kubanka was 12.3 bushels less than for Monad, a durum variety showing strong resistance to stem rust. Bushel weights likewise showed marked disparity.

For the western areas of the state, with the two varieties Marquis and Kubanka yielding the same, it is not evident that the durum varieties grown by farmers had any advantage over the hard red spring varieties. As a matter of farm practice the durum wheats have certain disadvantages such as a relative weakness of straw, lateness of ripening, and difficulty of threshing. Also during the years when durum wheat was commonly grown in those areas subject to rust the market was oversupplied with a resulting price discount on the market.

#### Recent yield comparisons

From the foregoing it is evident the durum wheat varieties could easily compete with the common wheats in those areas where epidemics of stem rust not infrequently occurred even if the price of durum wheat was not too far below the price of common wheat. During the years indicated in table 1 active breeding work was under way at dif-

ferent experiment stations for the production of new varieties of common wheat which would be resistant to stem rust. This work has attained a considerable degree of success and it is now possible to make yield comparisons somewhat similar to those shown in table 1. In this comparison Rival is taken as the type of hard red spring wheat and Mindum as the durum type. The available comparisons are shown in table 2.

Yields of Mindum for Fargo and Langdon from table 2 are 2.5 bushels above Rival while Rival exceeds Mindum at Edgeley by 2.1 bushels. The average excess of Mindum is one bushel. All of these values are significant. The difference at Dickinson is one-tenth bushel. Rival was used in the above comparisons as it has become the dominant wheat in the eastern two-thirds of the state and available for growing since 1939, the date of the previous census. The Mida variety, introduced in 1944, is

**Table 2.—Comparable average yields of Rival and Mindum at four experiment stations in North Dakota for a total of 28 years, seven at each locality, from 1940 to 1946. Bushels per acre.**

	Fargo	Edgeley	Langdon	Average	Dickinson
Rival .....	26.7	25.1	34.9	28.9	19.2
Mindum .....	29.0	23.0	37.6	29.9	19.3

higher yielding than Rival. Marquis for the seven years 1940 to 1946, the same period covered by table 2, did relatively less well than for 1919 to 1932, of table 1, as it yielded 9.4 bushels less than Mindum for 11 station years at Fargo and Langdon and 4.4 bushels less than Mindum at Dickinson for seven years.

For the benefit of those desiring information on the complete record of Rival and Mindum comparisons available in North Dakota Table 2-A follows:

clude the major durum area. The two curves of the figure show a decrease of the durum wheat acreages for each district, from 1939 to 1944, with a corresponding increase for the hard red spring varieties. The values in the table in Figure 1 indicate in thousands of acres for each district the actual decrease in the durum acreages for the 5-year period. Towner county was alone in showing a definite net gain of durum acreage while Towner, Ramsey, and Nelson were the only counties to show a nominal

**Table 2-A.—Comparative Yields of Rival and Mindum  
Bushels per Acre**

	Fargo 1936-'46	Edgeley 1939-'46	Langdon 1936-'46	Dickinson 1935-'46 excluding 1936 and '41
Rival .....	26.6	23.1	29.1	17.6
Mindum .....	27.1	21.1	29.2	16.6

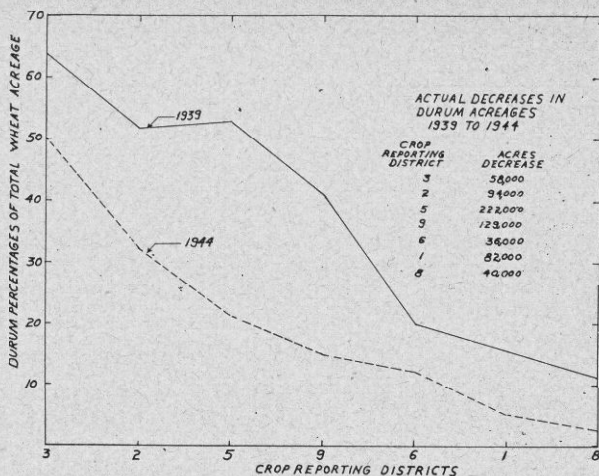
The years 1936 and 1941 are excluded from the Dickinson averages because the results are not comparable due to injury to the plots those two years.

#### **Lessened acreages of durum wheat**

With the above as a background the decrease of the durum wheat acreage shown by the census reports may be better understood. The acreages by counties were averaged for each crop reporting district and the results are shown in figure 1. Two crop reporting districts, four and seven, are omitted as their durum acreage is of minor importance. An exception was made for McLean county the acreages of which were included in district 5. Districts 1, 4 and 7 border Montana while districts 3, 6 and 9 are adjacent to Minnesota. Districts 2 and 3, in the north, in-

gain in durum acreage. Cavalier county in 1944 scarcely maintained its 1939 durum acreage but showed an increase of 38,000 acres of common wheat. These four counties are in the heart of the durum wheat belt. Farther south, near the South Dakota border, reduction of durum acreage was marked. It is known that in those counties with a decided gain in common wheat, accompanied with a loss of the durum acreage, Rival wheat, introduced in 1939, had become the leading variety by 1944.

If this study were carried into South Dakota it could be shown that some of the northeastern counties, with a predominant durum acreage in 1939, were just as strongly devoted to hard red spring wheat in 1944, mainly through the introduction of Rival.



**Figure 1.**—Graph showing percentage changes in durum wheat acreage in North Dakota from 1939 to 1944 by crop reporting districts. Districts 3 and 2, located in northeastern North Dakota, comprise the main durum area. Actual acreage decreases are shown in the table inserted in the figure.

#### Counties in Crop Reporting Districts in Durum Growing Areas (See Figure 1.)

**No. 3**  
Towner  
Cavalier  
Ramsey  
Pembina  
Walsh  
Nelson  
Grand Forks

**No. 2**  
Bottineau  
McHenry  
Rolette  
Pierce  
Benson

**No. 5**  
Sheridan  
Wells  
Eddy  
Foster  
Kidder  
Stutsman

**No. 9**  
Logan  
LaMoure  
Ransom  
Richland  
McIntosh  
Dickey  
Sargent

**No. 6**  
Griggs  
Steele  
Traill  
Barnes  
Cass

**No. 1**  
Divide  
Burke  
Renville  
Williams  
Mountrail  
Ward

**No. 8**  
Morton  
Burleigh  
Grant  
Emmons  
Sioux

#### Movement of the durum area in the state

An early estimate of the relative geographic position of the two classes of wheat in North Dakota is found in Public Document No. 11 of 1910 issued by North Dakota. The Commissioner of Agriculture and Labor reports purchases of common and durum wheat for 1909 by elevators and warehouses. The data, shown for most of the important counties, are sufficient to give a

fair estimate. Only 7 percent of the total wheat purchased was durum and this 7 percent, totaling nearly 4 million bushels, was handled mainly in six southeastern counties. The five counties which now form the heart of the durum area were reported in 1909 as handling but 7 percent of the durum wheat set forth in the document while their durum production for 1944 was nearly half of the state's total. This northward movement of the

durum acreage in the state was still in progress during the period from 1939 to 1944 as was shown above.

### Relative acreages and prices

Epidemics of stem rust, so prevalent before the introduction of resistant varieties, have had a pronounced effect upon the relationship of the two classes of wheat with respect to acreages and prices. Since the introduction of durum wheat to that area of the United States where spring wheat is the leading wheat crop, North Dakota has grown the larger percentage of the durum crop. Within the state the percentage of durum wheat, with relation to the total wheat acreage of the state, has varied greatly. These two relations may be expressed in percentages and are shown in table 3 for 5-year intervals starting with 1919 concurrent with the census periods.<sup>1</sup>

Table 3.—Percentages of durum wheat grown in North Dakota relative to the acreages grown in the four spring wheat states and the percentages grown in North Dakota relative to the total wheat acreage of the state

Year	Durum acreage in North Dakota relative to:	
	(1) The durum acreage in the four states indicated	(2) The total wheat acreage in North Dakota
	%	%
1919 .....	71	35
1924 .....	68	32
1929 .....	69	39
1934 .....	71	22
1939 .....	79	30
1944 .....	88	19

As the four spring wheat states, Minnesota, the two Da-

kotas, and Montana, carry nearly 100 percent of the durum acreage, the small amount grown in other states can be neglected. The durum acreage in North Dakota, relative to the total, as seen in table 3, has become of increasingly greater relative importance since 1919 when the first official estimates became available. The durum acreage grown in North Dakota in 1944 was 88 percent of the 4-state total durum.

In 1919, following the severe rust epidemic of 1916, durum wheat occupied 35 percent of the wheat acreage in North Dakota and this was up to 39 percent by 1929. Following the introduction of the Ceres variety the durum percentage dropped to 22 percent but went up to 30 percent following the rust epidemic of 1935. The introduction of Thatcher was undoubtedly a factor in preventing a more pronounced shift. After 1939, following the introduction of Rival, Pilot, Regent, and Renown the durum acreage in North Dakota in 1944 was 19 percent of the total wheat acreage.

### Prices of durum and common wheat

The price of durum wheat in relation to common wheat has varied greatly through the years, reacting to its relative abundance. The daily price cards, issued from Minneapolis, showed for the year 1922 an average differential of 19 cents per bushel in favor of common wheat. The production of durum wheat for that year was over 46 million bushels which was perhaps twice the quantity which could be milled to an advantage in this

<sup>1</sup>The data were secured from a series of circulars and bulletins from the U.S. Dept. of Agric. by J. A. Clark et al., and from the U.S.D.A., Agric. Stat., 1945.

country. During 1946 the price differential has reflected the shortage of durum wheat as the price offered for the year averaged 5 cents above common wheat as indicated by mimeographed reports issued by the Bureau of Agric. Econ.

Durum wheat, during the past 40 years, has developed from a small beginning into an important element of our agriculture. During these years it has been the subject of much controversy. The wheat has been vigorously denounced or ardently defended, depending upon the point of view. The real source of the differences of opinion, we know now, was the lack of rust resistant varieties of common wheat. We have these now and a proper price differential should provide the trade with a sufficient sup-

ply of durum wheat. It must be remembered that there is considerable lag between relative price changes and a corresponding change on the farm, in switching from one class of wheat to another.

Notable work has been done in the breeding of durum wheat by Glenn Smith, a federal agronomist located at North Dakota experiment station. The new varieties bred by him, Carleton and Stewart, have become of importance and his present work points the way to even greater improvements. We should see in the future the introduction of high-yielding varieties with stiffer straw and earlier ripening which will largely set aside the objections which have been raised against the growing of durum wheat.

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### STEWART DURUM ACCEPTED IN CANADA

The new durum variety, Stewart, has been licensed for growing in Canada. Approval of Stewart came after the customary trial period of three years, in which it was tested in the Canadian Durum Co-operative Test at various experiment stations in Manitoba and Saskatchewan.

Both Carleton and Stewart durums were released in 1943 by the North Dakota Experiment Station. The new durums have behaved similarly in Canadian and United States experiments. Both varieties have proven consistently better than Mindum or Pelissier in stem rust resistance, and both are excellent in macaroni quality. Stewart has generally yielded better than Mindum or Carleton, and resists shattering, but Carleton has stiff straw and performs well on summer fallow. Both varieties are becoming widely established in the durum area of the United States.

Carleton was previously licensed for distribution in Canada in 1944. This official approval is necessary in Canada before any wheat variety can enter the top market grades. (H.L.W.)