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Experiment Station

5-1-1969

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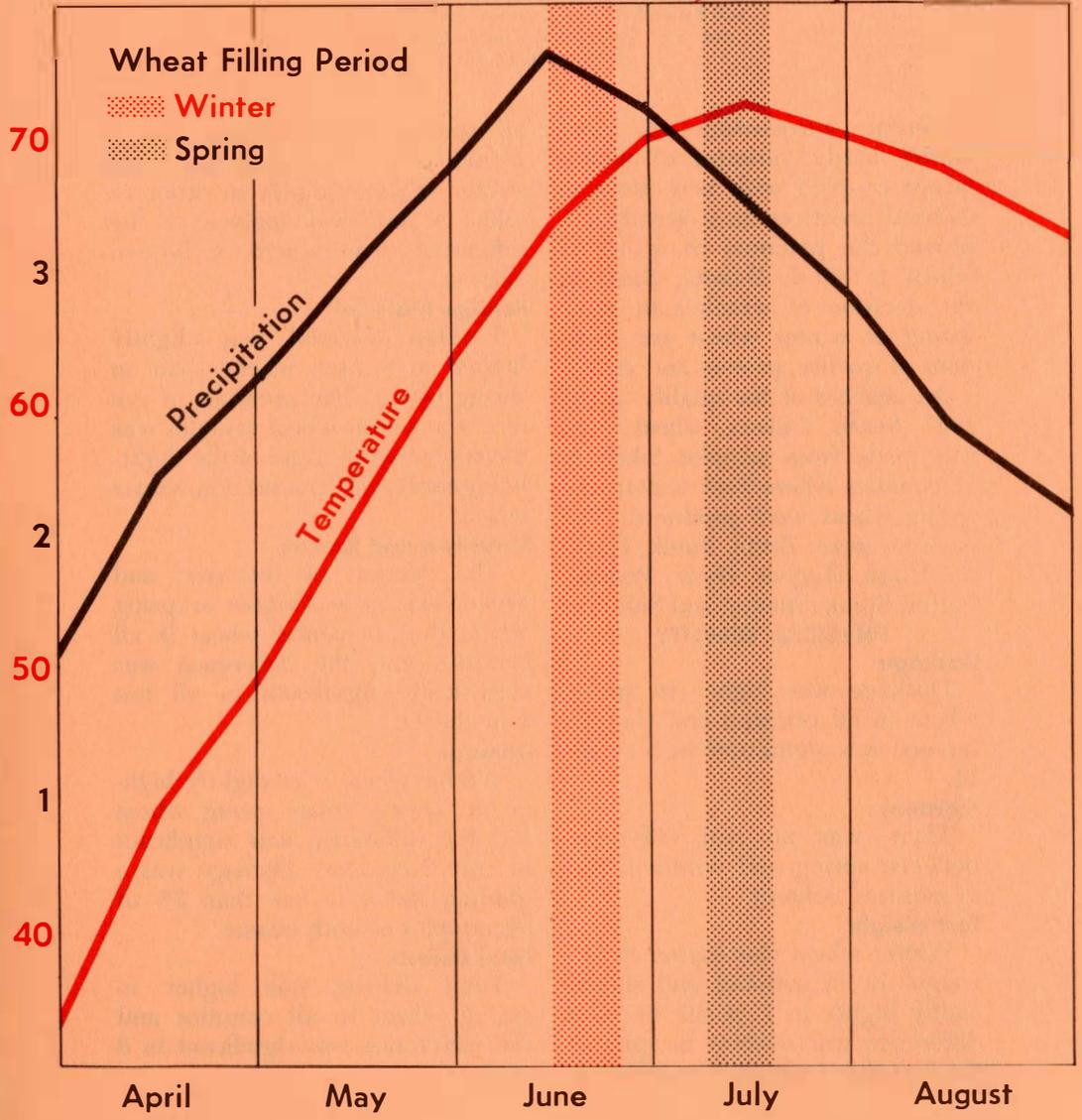
Kinch, R. C. and Pence, R. A., "Wheat Quality and Yield. . . Spring versus Winter" (1969). *Bulletins*. Paper 560.
http://openprairie.sdstate.edu/agexperimentsta_bulletins/560

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Wheat Quality and Yield . . . SPRING vs. WINTER

Precipitation in Inches
Temperature in Degrees F.

winter wheat harvest
spring wheat harvest



Wheat Quality and Yield . . .

SPRING vs. WINTER

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Recent introduction of more winter hardy varieties of winter wheat coupled with new ideas in cultural practices have greatly improved the potential of winter wheat in South Dakota. Basic to the decision of whether to grow spring or winter wheat are questions of quality, protein and yield.

An analysis of the quality of the 1967 South Dakota wheat crop was made from samples taken in 11 counties where both winter and spring wheat were produced. The counties were: Butte, Faulk, Haakon, Hand, Hughes, Hyde, Perkins, Potter, Spink, Stanley and Sully.

PHYSICAL QUALITY

Dockage

Dockage was higher in spring wheat in all counties and the difference was significant in 8 of the 11.

Moisture

There was no real difference between spring and winter wheat in moisture content.

Test Weight

Winter wheat was higher in test weight in all counties and significantly higher in 7 of the 11. This difference was evident in spite of the fact that 1 pound was added to

all spring wheat samples and 1 pound was subtracted from all winter wheat samples in order to allow a statistical analysis of the difference in test weight of the two classes.

Foreign Material

Foreign material was slightly higher in winter wheat than in spring wheat. The presence of rye in a few winter wheat samples was the contributing cause of the slightly higher foreign material in winter wheat.

Shrunken and Broken

The percent of shrunken and broken kernels was higher in spring wheat than in winter wheat in all counties and the difference was statistically significant in all but 1 of the 11.

Damage

Winter wheat was slightly higher in damage than spring wheat but the difference was significant in only 3 counties. Damage was a grading factor in less than 3% of all samples of both classes.

Total Defects

Total defects was higher in spring wheat in all counties and this difference was significant in 8 of the 11.

CHEMICAL QUALITY

Protein

Protein is a chemical quality factor and while not an actual grading factor, it does influence the price paid for wheat in the market place. As expected the protein content of spring wheat was significantly higher in all counties.

DISCUSSION

Winter wheat is definitely better than spring wheat in dockage content, test weight, shrunken and broken kernels and total defects. There was very little difference between winter and spring wheat in foreign material and damage, although neither grading factor lowered the grade of more than 3% of either class of wheat. Spring wheat was definitely higher in protein content than winter wheat.

A comparison of the filling periods in relation to rainfall and temperature may help explain some of the differences in the quality (see chart on front cover). Note that winter wheat is filling during the period of maximum precipitation but before the period of

maximum temperature, while spring wheat is filling during the period of maximum temperature and reduced precipitation. High temperatures could keep the kernels from filling properly which would account for higher dockage, lower test weight, higher shrunken and broken kernels and higher total defects.

On the other hand, high protein is favored by reduced precipitation and humidity during ripening and harvesting. This condition definitely favors spring wheat and in a large measure accounts for the higher average protein of spring wheat.

Yield

Winter wheat usually produces a significantly greater average yield when compared with spring wheat (table 1). Stem rust in 1965 lowered winter wheat yields. However, most of the spring wheat grown in 1965 was of the new improved rust resistant varieties so spring wheat was not as severely affected. The new improved rust resistant varieties of winter wheat now being grown should prevent

Table 1. Comparison of yield in bushels per harvested acre of Spring and Winter Wheat in 11 counties in South Dakota.*

Counties	1963		1964		1965		1966		1967		5 Yr. Av.	
	S	W	S	W	S	W	S	W	S	W	S	W
1. Spink	10.5	13.0	13.5	20.5	16.0	15.0	15.0	22.0	24.5	33.0	15.9	20.7
2. Haakon	17.0	19.0	15.5	29.5	18.5	17.0	11.0	26.0	26.0	38.5	17.6	26.0
3. Hand	12.0	18.5	13.0	20.0	16.0	20.0	12.5	24.5	21.0	30.0	14.9	22.6
4. Potter	15.5	16.5	15.5	22.5	18.5	15.0	14.5	22.0	23.5	31.0	17.5	21.4
5. Faulk	13.5	13.0	14.5	22.5	16.5	17.0	14.0	20.0	23.5	27.0	16.4	19.8
6. Perkins	17.5	21.0	13.0	18.0	17.5	14.5	13.0	22.0	24.0	35.0	17.0	22.1
7. Butte	23.0	31.0	15.0	22.5	17.5	12.0	15.5	31.5	24.5	45.5	19.1	28.5
8. Stanley	11.0	17.5	13.5	27.5	16.0	17.5	11.5	27.0	24.0	36.0	15.2	25.1
9. Sully	14.0	17.5	15.5	22.5	18.0	15.0	10.5	21.0	22.5	34.0	16.1	22.0
10. Hughes	12.5	13.5	13.0	25.5	17.0	15.5	10.0	20.0	21.0	36.0	14.7	22.1
11. Hyde	12.0	14.0	12.5	22.5	17.5	16.0	12.5	20.0	22.0	33.0	15.3	21.1

*Data from the Crop and Livestock Reporting Service Annual Reports.

the recurrence of such drastic reductions in yield and quality of winter wheat.

CONCLUSIONS

Moisture, damage and contrasting classes were not found to be important factors affecting the quality of South Dakota produced hard red spring and hard red winter wheat.

The overall physical quality of winter wheat was better than that of spring wheat. Spring wheat was higher in dockage, lower in test weight, and higher in total defects.

Foreign material was slightly higher in winter wheat but this factor seldom affected grade in either class of wheat.

Protein was considerably higher in spring wheat than in winter wheat.

Winter wheat had a distinct advantage in yield over spring wheat in all counties studied.

The distinct advantage of winter wheat over spring wheat in physical quality factors and in yield (bushels per acre), and the definite advantage of spring wheat over winter wheat in protein content may largely be explained by actual differences in time of filling and maturing of the heads of spring and winter wheat in relation to the periods of maximum precipitation and maximum temperature.

5-69—10M—9111

Reprinted 10-69—10M—9920