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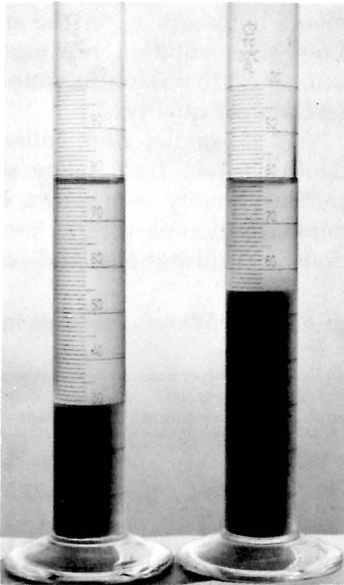
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# Wheat Sedimentation Testing in South Dakota



Wheat in the left cylinder tested 30; higher quality wheat in the right cylinder tested 55.

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# Wheat Sedimentation Testing

By R. C. Kinch, Professor of Agronomy

Sedimentation studies of hard red spring and hard red winter wheat produced in South Dakota were begun at South Dakota State College in 1962. A grant from the South Dakota Wheat Commission facilitated the purchase of necessary equipment for a sedimentation testing laboratory supervised by the Agronomy Seed Laboratory.

The sedimentation test is a composite evaluation of both the quantity and quality of protein in bread wheat. It is not a complete measure of baking quality, but it is an easily performed test which indicates, in

a general way, the market quality (bread making quality) of a sample of wheat. High sedimentation test readings indicate wheat high in protein content and in protein quality. Such wheat yields flour that has a high bread loaf volume and commands a premium on the market. Low sedimentation readings indicate wheat that is low in protein content and/or quality.

Wheat samples were collected in South Dakota from many sources such as: county crop shows, county demonstration plots, experiment stations and substations, and certified

**Table 1. Sedimentation Test Readings of Bread Wheats Produced in South Dakota in 1961**

Variety	No. of samples	Average sedimentation	Range
<b>Spring Wheat Varieties</b>			
Canthatch .....	12	63.9	53.8-72.0
Lee .....	17	56.5	37.0-63.2
Mida .....	3	54.0	51.3-59.1
Pembina .....	41	68.8	52.0-78.9
Selkirk .....	15	49.1	34.0-62.8
Spinkcota .....	3	38.0	37.0-39.0
Other varieties .....	8	59.0	31.0-70.5
All samples .....	99	60.94	
<b>Winter Wheat Varieties</b>			
Nebred .....	11	51.8	30.5-73.8
Omaha .....	4	52.1	50.1-54.5
Warrior .....	4	63.4	60.5-67.0
Other varieties .....	9	47.5	27.7-64.4
All samples .....	28	52.12	

Table 2. Sedimentation Test Readings of Bread Wheats Produced in South Dakota in 1962

Variety	No. of samples	Average sedimentation	Range
<b>Spring Wheat Varieties</b>			
Canthatch .....	24	56.4	28.4-74.3
Justin .....	18	65.5	42.0-72.8
Lee .....	19	57.8	35.5-71.0
Pembina .....	26	69.3	40.4-76.4
Rushmore .....	19	55.2	26.9-69.1
Selkirk .....	19	59.5	29.4-71.9
Spinkcota .....	2	40.6	36.9-44.4
Other varieties .....	25	56.4	36.9-69.5
All samples .....	152	59.89	
<b>Winter Wheat Varieties</b>			
Bison .....	7	54.2	20.6-69.6
Cheyenne .....	5	49.5	40.8-68.0
Minter .....	7	54.4	41.3-68.0
Nebred .....	12	44.6	25.2-63.1
Omaha .....	23	45.1	29.7-66.0
Ottawa .....	6	65.4	58.9-71.0
Pawnee .....	4	43.4	38.1-51.0
Warrior .....	7	53.4	43.6-67.0
Wichita .....	4	51.1	39.9-59.0
Other varieties .....	18	49.2	31.5-69.0
All samples .....	93	49.57	

seed producers. Tables 1 and 2 summarize the results of tests on wheat samples grown in 1961 and 1962.

Varietal differences in average sedimentation readings are apparent in both spring and winter wheats. In general, the newer varieties averaged higher in sedimentation values than varieties which have been grown for a long time. The newer spring wheat varieties are Pembina, Canthatch, and Justin. The winter wheat varieties with the higher readings are Warrior and Ottawa.

Spring wheat had a higher average reading than did winter wheat, although some winter wheat samples did have high sedimentation test values. Many lots of spring

wheat and some of winter wheat had very high readings.

#### LOCATION EFFECTS

The wide range of sedimentation test readings emphasized the importance of local environmental conditions in determining wheat quality. The great variability within and between varieties indicated that the effect of environment such as rainfall, temperature, disease development, soil fertility, and soil management, to mention only a few, is important in wheat quality.

Table 3 shows the two classes of wheats grouped according to county of origin. It must be recognized that these data are for a limited

**Table 3. Sedimentation Test Readings of Spring and Winter Wheat Grown in 1962 When Grouped According to County of Origin**

County	No. of samples	Average sedimentation	Range
<b>Spring Wheats</b>			
Brown .....	8	67.71	62.5-74.1
Beadle .....	12	60.18	44.5-72.0
Brookings .....	10	56.33	44.4-67.0
Hamlin .....	7	68.11	63.7-72.8
Hyde .....	13	57.74	36.7-72.8
Jackson .....	7	65.67	59.1-71.5
Lyman .....	11	52.97	36.8-70.0
Sully .....	8	56.87	41.0-76.3
Ziebach .....	17	60.46	39.1-74.3
Other counties .....	33	59.30	26.9-74.7
<b>Winter Wheats</b>			
Bennett .....	7	47.60	38.5-54.7
Jackson .....	19	60.90	45.0-68.8
Hyde .....	8	42.12	20.6-58.9
Lawrence .....	7	45.90	31.7-54.0
Lyman .....	7	48.94	30.9-60.6
Sully .....	18	50.11	17.3-71.3
Tripp .....	7	35.78	31.9-40.6
Other counties .....	16	46.31	29.17-40.16

number of samples and reflect growing conditions in 1962.

Averages of sedimentation values by counties could be interpreted to indicate average growing conditions in the counties. The higher sedimentation values indicate the more favorable wheat growing areas in 1962. In counties where stem rust lowered the yield and quality of winter wheats, the sedimentation values were also low. Winter wheats varied greatly within most counties,

reflecting mainly the variability of stem rust infection from field to field.

Test weight, one of the most commonly used and one of the more important grading factors of wheat, is largely an expression of favorable or unfavorable conditions (climate, soil and disease) at the time wheat ripens. Wheat weighing less than 58 pounds to the bushel grades no higher than No. 3. Wheat weighing less than 58 pounds had a much lower

**Table 4. Average Sedimentation Values for Spring and Winter Wheat Samples Grouped According to Test Weight**

	Average sedimentation
<b>Spring Wheat</b>	
58 pounds or more.....	61.96
Below 58 pounds.....	53.07
<b>Winter Wheat</b>	
58 pounds or more.....	49.98
Below 58 pounds.....	40.26

sedimentation value than the higher test weight samples.

### **CONCLUSIONS**

Spring wheats averaged somewhat higher in sedimentation values than did winter wheats.

Many spring wheat and some winter wheat samples had very high

sedimentation test values.

Sedimentation test values varied widely within and between varieties.

Distinct varietal differences were found in both spring and winter wheats. In general the newer spring and winter varieties had higher average sedimentation test values.

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The South Dakota Agricultural Experiment Station expresses sincere appreciation to the South Dakota Wheat Commission for their cooperation in this study.

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