

# Effect of Storage on the Feed Value of Hard Red Spring Wheat

By  
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**W**heat from the 1940 crop which had been obtained from farm storage in the summer of 1941 and placed in storage bins at Jamestown, North Dakota by the Commodity Credit Corporation was found to show three distinct zones, when examined in the spring of 1944. Wheat from the bottom of the bin showed little damage during storage, that from the center of the bin showed some damage, and the wheat from the top of the bin showed greater damage.

Analysis of samples of these three lots of wheat, made by the Bureau of Plant Industry, Soils and Agricultural Engineering gave the results shown in Table 1.

**Table 1**  
**ANALYSIS OF THREE LOTS OF WHEAT FROM STORAGE BINS**

Factor	Wheat from		
	Top Center	Center Below Top	Bottom
Moisture, percent .....	14.8	14.1	12.2
Test weight per bushel, pounds	54.1	55.0	56.3
Total damage, percent .....	2.0	0.8	0.8
Total germination, percent .....	44.0	58.0	85.0
Dockage, percent .....	1.0	0.4	0.5
Grade .....	4DNS tough	3 D N S	3 D N S

The Department of Cereal Technology, North Dakota Agricultural Experiment Station made moisture and total nitrogen determinations with the results shown in Table 2.

**Table 2**

	Wheat from		
	Top Center	Center Below Top	Bottom
Moisture, percent .....	14.2	13.5	12.4
Total nitrogen percent .....	2.49	2.88	2.80
Calculated protein percent .....	15.70	16.40	16.00

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The differences in germination and in test weight suggested a possible effect on nutritive values. A quantity of each of the three lots was obtained by the experiment station and used in a feeding trial with fattening pigs.

Forty feeder pigs were purchased for this work. These were grade pigs and weighed an average of 115 pounds. They were divided into four uniform lots of 10 pigs each. The pigs were identified individually with ear notches and individual liveweight records were kept. Three of the lots were fed individually as follows:

Lot 1—91 percent top center wheat, 9 percent supplement

Lot 2—93 percent center below top wheat, 7 percent supplement

Lot 3—92 percent bottom wheat, 8 percent supplement

Lot 4—was self fed, free choice, the three mixtures which were fed to Lots 1, 2 and 3, to determine whether any differences existed in palatability.

The supplement consisted of 50 percent meat and bone meal, 25 percent soybean oilmeal and 25 percent alfalfa meal.

After about five weeks, several pigs in Lots 1, 2 and 3 developed necrotic enteritis. The affected pigs were treated with sulfaquinoxaline and nicotinic acid. Two pigs died in each of the three lots and the other diseased pigs stopped eating and lost weight. Five pigs in Lot 1, 6 in Lot 2 and 5 in Lot 3 showed no evidences of infection. None of the pigs in Lot 4 became infected, although they were in a pen adjoining Lot 3. The results obtained with those pigs which were not infected are shown in Table 3.

Although the gains show a slight inverse relationship to the degree of damage to the wheat, the differences are not great enough to be important. No appreciable differences in the amounts of feed required to produce 100 pounds gain were found. The pigs in Lot 4, self fed, ate almost exactly equal quantities of the three kinds of wheat, thus indicating no difference in palatability. The most interesting result was the freedom from necrotic infection of the pigs in Lot 4. This lot consumed more feed per pig and gained more rapidly than those which were fed individually. The amount of feed required to produce 100 pounds gain was

Table 3

### SUMMARY OF FEED AND WEIGHT RECORDS JUNE 15 to JULY 28, 1944

	Lot 1 Top Center Wheat	Lot 2 Center Below Top Wheat	Lot 3 Bottom Wheat	Lot 4 Three wheats self fed
Number of pigs finishing trial	5	6	5	10
	Pounds	Pounds	Pounds	Pounds
Total final weight	885	1,090	883	1,992
Total initial weight	578	713	561	1,175
Total gain	307	377	322	817
Average gain	61.4	62.8	64.4	81.7
Average daily gain	1.40	1.42	1.46	1.86
Feed consumed per 100 pounds gain				
Wheat	302.9	305.0	301.9	313.4
Supplement	30.0	22.8	26.0	27.3
Total	332.9	327.8	327.9	340.7

slightly greater in Lot 4 than in the other lots.

#### Summary

1. Three kinds of wheat obtained from different parts of wheat stored in grain bins were analyzed and used as feed for fattening pigs.
2. The analysis showed differences in moisture, test-weight, total nitrogen and germination.
3. No differences in feeding value for fattening pigs were found.
4. Pigs self fed the three lots of wheat, free choice, consumed equal amounts of each.
5. The self fed pigs did not develop necrotic enteritis, while several pigs in each of the three individually fed lots became infected, and two pigs died in each of the three lots.

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### JAMES RENFREW DICE

Professor J. R. Dice, chairman of the Department of Dairy Husbandry and assistant to the Dean of Agriculture and Director of the Experiment Station of the North Dakota Agricultural College, died May 18, 1945.

Professor Dice was born July 6, 1887, at Enon, Pennsylvania, and was graduated from Michigan State College in 1908 with the degree of Bachelor of Science. He received his Master of Science degree from the University of Missouri in 1919.

Professor Dice was farm manager at Pontiac, Michigan, from 1908 to 1909, instructor of Dairy Industry at the University of Maine from 1909 to 1910, head of the Department of Dairy and Animal Husbandry at the New York School of Agriculture at Morrisville, from 1910 to 1919. He was chairman of the Department of Dairy Husbandry of the North Dakota Agricultural College from 1920 to 1945. At this institution he taught and conducted research work on problems in dairy production. He served for several years as secretary of the North Dakota Dairymen's Association, and was a past president of that association. He did much constructive work in an advisory capacity to that association, as well as to the various breed associations.

Professor Dice was the author of numerous scientific publications, including "Feeding and Management of Dairy Cattle," "Potatoes for Dairy Cows," and "The Pen Barn and Separate Milking Room," and "Influence of Stable Temperature on the Production and Feed Requirements of Dairy Cows."

Professor Dice was a long-time member of the American Dairy Science Association, where he served on several important committees.

He is survived by his wife, Mrs. Marion Welch Dice, and one son, James Harris Dice.

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