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South Dakota Swine Field Day Proceedings and  
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Animal Science Reports

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1974

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## Recommended Citation

Wahlstrom, Richard W.; Libal, George W.; and Robbins, Steve L., "High Protein Oats as a Replacement for Corn in Growing-Finishing Swine Diets" (1974). *South Dakota Swine Field Day Proceedings and Research Reports, 1974*. Paper 8.  
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High Protein Oats as a Replacement for Corn  
in Growing-Finishing Swine Diets

Richard C. Wahlstrom, George W. Libal and Steven L. Robbins

For years it has been stated that ground oats can replace approximately 25% of the corn in diets for growing swine without a significant effect on rate or efficiency of gain. Levels of oats higher than 25% have been suggested to reduce pig performance. Recent work by plant breeders has resulted in several varieties of oats that are considerably higher in protein than varieties of the past. One of these oat varieties is Dal, an oats that contains a high level of groat (the grain remaining after hull removal) and one that is also high in protein content.

The objectives of this experiment were to evaluate the protein quality of Dal oats and to determine the feeding value of this oats when used to replace different levels of corn in diets for growing-finishing swine.

Experimental Procedure

Ninety-six crossbred pigs averaging 60 lb. were allotted on the basis of weight, ancestry and sex to three replicates of four treatments. Each lot consisted of four barrows and four gilts. The pigs were housed on slatted floors in a completely enclosed confinement building.

The experimental treatments were as follows:

1. Basal diet, no oats
2. Oats as 20% of the grain
3. Oats as 40% of the grain
4. Oats as 60% of the grain

The composition of the diets is shown in table 1. Diets were calculated to contain equal amounts of lysine. The Dal oats contained 0.66% lysine, while corn and soybean meal were estimated to contain 0.26 and 2.90% lysine, respectively. The diets fed to 120 lb. were calculated to contain 0.74% lysine and the diets fed from 120 to 200 lb. contained 0.60% lysine. Proximate analyses of the Dal oats and the complete diets for both the growing and the finishing stages are shown in table 2.

Results

The growth and feed data for this trial are summarized in table 3. No statistical differences for any criteria during any stage of growth were seen due to dietary treatment. During the growing stage, 60 to 120 lb., pigs receiving diets which contained oats as either 40% or 60% of the grain grew slightly slower (1.58 and 1.57 compared to 1.60 and 1.65 lb./day) and were somewhat less efficient in feed conversion (2.97 and 2.82 compared to 2.74 and 2.75) than pigs receiving diets which contained oats as 0% or 20% of the grain. During the finishing stage

the pigs receiving 40% and 60% oats gained as fast or faster than the other groups and were as efficient in feed conversion as these groups. For the overall growing-finishing period, gain and feed conversion means were similar for all treatment groups.

In this study high protein oats was successfully fed at a rate of 60% of the diet without any adverse effects on gain and feed efficiency. Due to formulation of all diets for an equal lysine content, the use of high protein oats also resulted in a major reduction of soybean meal (approximately 8% for the 60% oats diet) needed to supply protein to the diet.

### Summary

Ninety-six crossbred pigs were fed diets consisting of corn as the sole source of grain compared to a high protein oats (Dal) as 20, 40 or 60% of the grain supplied in the diet. All diets were formulated to be equal in lysine content. The increasing levels of oats resulted in decreasing levels of soybean meal required to supply protein to the diet. No significant differences in average daily gain or feed efficiency were found due to dietary treatments, indicating that the high protein oats could be fed at these levels with no adverse effects on production and with a savings in supplemental protein.

Table 1. Composition of Diets (Percent)<sup>a</sup>

Ingredients	To 120 lb.				120 to 200 lb.			
	1A	2A	3A	4A	1B	2B	3B	4B
Ground corn	79.05	65.15	50.4	34.8	84.5	69.68	54.0	37.2
Ground oats	--	16.3	33.6	52.2	--	17.42	36.0	55.8
Soybean meal (44%)	18.4	16.0	13.38	10.52	13.1	10.5	7.65	4.7
Dicalcium phosphate	1.2	1.2	1.2	1.15	1.0	1.0	1.0	0.95
Ground limestone	0.65	0.65	0.62	0.63	0.7	0.7	0.65	0.65
Trace mineral salt <sup>b</sup>	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Vitamin-antibiotic premix <sup>c</sup>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

<sup>a</sup> Diets fed to 120 lb. calculated to contain 0.74% lysine and diets from 120 to 200 lb. calculated to contain 0.60% lysine.

<sup>b</sup> Contained 0.8% zinc.

<sup>c</sup> Supplied per lb. of diet: vitamin A, 1500 IU; vitamin D, 150 IU; riboflavin, 1.25 mg; pantothenic acid, 5 mg; niacin, 10 mg; choline, 50 mg; vitamin B<sub>12</sub>, 7.5 mcg and aureomycin, 10 milligrams.

Table 2. Proximate Analysis of Dal Oats and the Complete Experimental Diets (%)

	Dal oats	Experimental diets							
		1A	2A	3A	4A	1B	2B	3B	4B
Moisture	10.0	11.4	11.1	12.0	11.9	13.0	12.1	11.6	11.2
Protein	16.1	14.4	15.4	14.9	16.0	13.8	14.7	16.0	14.0
Fat	4.4	2.8	2.9	2.7	3.1	2.6	2.8	2.8	3.3
Ash	3.2	4.2	4.5	4.6	4.8	3.8	4.4	4.3	4.7
Crude fiber	13.2	3.8	5.1	7.2	9.1	3.6	5.8	7.1	9.1
NFE	53.1	63.4	61.0	58.6	55.1	63.2	60.2	58.2	57.7

Table 3. Effect of High Protein Oats as a Replacement for Corn in Growing-Finishing Swine Diets

	Control	20% oats	40% oats	60% oats
Number of pigs	24	24	24	24
Avg. initial wt., lb.	59.7	59.7	60.0	59.7
Avg. final wt., lb.	200.6	200.8	200.5	205.2
<u>Initial to 120 lb.</u>				
Avg. daily gain, lb.	1.60	1.65	1.58	1.57
Daily feed consumed, lb.	4.37	4.53	4.34	4.42
Feed/gain	2.74	2.75	2.97	2.82
<u>120 lb. to market</u>				
Avg. daily gain, lb.	1.65	1.68	1.75	1.69
Daily feed consumed, lb.	5.54	5.68	5.88	5.83
Feed/gain	3.36	3.43	3.37	3.45
<u>Initial to market</u>				
Avg. daily gain, lb.	1.62	1.67	1.66	1.64
Daily feed consumed, lb.	5.02	5.16	5.16	5.21
Feed/gain	3.09	3.12	3.11	3.19