

THE EFFECT OF WHEAT VS. CORN ON PERFORMANCE IN TWO LINES OF GROWING-FINISHING SWINE

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Story in Brief

Three feeding trials with a total of 570 growing-finishing pigs were conducted to compare corn vs wheat as a feedstuff for swine using rations formulated on an equal lysine basis. Average daily gain, average daily feed intake, feed efficiency and backfat were similar in pigs fed either the wheat or corn diet although some differences in response between a rapid growth line and a slow growth line were observed for average daily gain. This study suggests that when proper formulation procedures are used, wheat is comparable with corn as a feedstuff for growing and finishing swine.

(Key Words: Wheat, Growing-Finishing Swine, Performance)

Introduction

Although wheat has been the grain source in swine rations which would produce the least cost gains at times during the past several years, swine producers have been reluctant to feed wheat because of previous unsatisfactory experiences or because of an unfamiliarity with feeding wheat. Producers who do choose to feed wheat will commonly limit the amount of wheat in swine rations to no more than half of the grain portion of the ration.

One of the potential problems encountered with wheat feeding is improper ration formulation. To take advantage of the higher levels of protein and amino acids in wheat, standard rations must be reformulated specifically for feeding wheat. Wheat-soybean meal rations formulated from standard growing or finishing ration and substituting wheat for either corn or milo will result in overfeeding both protein and the limiting amino acids. Conversely, formulating wheat rations to contain crude protein levels similar to those commonly used in milo or corn rations will result in a lysine deficiency and reduced performance. These trials were conducted to compare performance of growing-finishing swine fed wheat or corn based diets formulated on an equal lysine basis.

Materials and Methods

This trial was conducted at the Livestock and Forage Research Laboratory at El Reno and consisted of 570 pigs in 31 pens over three seasons. All pigs were housed in a feeding unit with indoor concrete floors and pens equipped with self-feeders and waterers. Pigs from a line selected for rapid growth and a line selected for slow growth were randomly allotted within line to two treatments (Table 1). All diets were formulated to contain 0.75% lysine during the growing period (42 - 121 lb) and 0.62% lysine during the finishing period (121 - 222 lb).

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The two treatments consisted of either a corn-soybean meal diet or a hard red winter wheat-soybean meal diet.

TABLE 1. Composition of experimental rations.

Ingredient	% Composition (as-fed)			
	Grower		Finisher	
	Corn	Wheat	Corn	Wheat
Corn, yellow	77.12		82.65	
Wheat, hard red winter		81.00		86.80
Soybean meal (44%)	19.03	15.37	14.06	10.15
Dicalcium phosphate	1.84	1.46	1.68	1.25
Calcium carbonate	0.76	0.92	0.76	0.95
Salt	0.50	0.50	0.50	0.50
Vitamin trace mineral mix ^a	0.25	0.25	0.25	0.25
Tylan 10	0.50	0.50	0.10	0.10
Total	100.00	100.00	100.00	100.00
Calculated Analysis				
% Protein	15.16	16.64	13.46	15.06
% Lysine	0.75	0.75	0.62	0.62
% Met + Cys	0.53	0.48	0.49	0.44
% Threonine	0.60	0.59	0.52	0.51
% Calcium	0.75	0.75	0.70	0.70
% Phosphorus	0.65	0.65	0.60	0.60

^aSupplied 4,000,000 IU vitamin A, 300,000 IU vitamin D, 4 g riboflavin, 20 g pantothenic acid, 30 g niacin, 800 g choline chloride, 15 mg vitamin B₁₂, 10,000 IU vitamin E, 2 g menadione, 200 mg iodine, 90 g iron, 20 g manganese, 10 g copper, 90 g zinc and 100 mg selenium per ton of feed.

Results and Discussion

During the growing period (42 - 121 lb, Table 2), pigs from the rapid growth line grew 2% faster when fed the wheat diet but pigs from the slow growth line grew faster (4.4%) when fed the corn diet. Although treatment differences were not significant for either line, this inconsistent response between lines resulted in a line by treatment interaction ($P < .01$). Average daily feed intake followed a pattern similar to that observed for average daily gain, although neither treatment effects nor the interaction was significant. Feed efficiency was similar for both corn and wheat fed pigs within each line. As

expected, pigs from the rapid growth line grew more rapidly and had a higher feed intake than pigs from the slow growth line. The results of this summary of three trials is similar to observations over a single trial (Maxwell et al., 1983) and suggest that hard red winter wheat is comparable with corn as a feedstuff for the growing pigs when diets are formulated on an equivalent lysine basis.

TABLE 2. Treatment means of two lines of pigs fed either wheat or corn during the growing period.

Item	Treatments			
	Rapid Growth Line		Slow Growth Line	
	Corn	Wheat	Corn	Wheat
Pigs per treatment, no	167	156	116	131
Pens per treatment, no	11	10	8	9
Avg initial wt, lb	47.5	45.0	35.1	38.9
Avg final wt, lb	123.9	122.8	118.9	115.2
Avg daily gain, lb ^{ab}	1.50	1.53	1.42	1.36
Avg daily feed intake, lb ^a	3.99	4.03	3.79	3.62
Feed per lb gain, lb	2.67	2.67	2.73	2.72

^aLine effect (P<.001).

^bLine by treatment interaction (P<.01).

During the finishing period (121 - 222 lb; Table 3), pigs fed corn grew slightly faster than pigs fed wheat in both the rapid growth line and the slow growth line although differences were not significant and resulted in only a 2.8% overall improvement in gain. Since this difference in gain was greater in the slow growth line (6.2%) than in the rapid growth line (0.5%), a line by treatment interaction (P<.08) was observed. Similarly, average daily feed intake averaged over both lines was only slightly higher (2.2%) for pigs fed the corn diet than those fed the wheat diet. Feed efficiency was similar for pigs fed the corn or wheat diet when summarized over both lines (3.44 vs 3.42 lbs of feed per lb of gain, respectively). Backfat was not affected by dietary treatment in this study. Pigs from the rapid growth line grew more rapidly, had a higher feed intake and were more efficient than pigs from the slow growth line. This summary of results of three feeding trials suggest that pigs perform similarly when fed corn or hard red winter wheat during the finishing period although there is some indication that slower growing pigs may have more of a tendency to prefer corn over wheat than faster growing pigs.

TABLE 3. Treatment means of two lines of pigs fed wheat or corn during the finishing period.

Item	Treatments			
	Rapid Growth Line		Slow Growth Line	
	Corn	Wheat	Corn	Wheat
Pigs per treatment, no	167	155	114	130
Pens per treatment, no	11	10	8	9
Avg initial wt, lb	123.9	122.8	118.9	115.2
Avg final wt, lb	224.8	224.3	220.3	215.0
Avg daily gain, lb ^{ab}	1.95	1.94	1.70	1.60
Avg daily feed intake, lb ^a	6.52	6.35	5.36	5.28
Feed per lb gain, lb ^c	3.31	3.36	3.56	3.49
Backfat, in	1.04	1.03	0.97	0.99

^aLine effect (P<.001).

^bLine by treatment interaction (P<.08).

^cLine by effect (P<.05).

Literature Cited

Maxwell, C.V. et al. 1983. Ok. Agr. Exp. Sta. Rpt. Mp. 114:152.