

WHEAT VS SORGHUM GRAIN FOR GESTATING GILTS

W.G. Luce¹, C.V. Maxwell², D.S. Buchanan²,
A.C. Clutter³, M.D. Woltmann⁴ and R. Venc⁵

Story in Brief

A study was conducted to compare diets of hard red winter wheat vs sorghum grain for bred gilts. A total of 264 gilts were allotted from three seasons to the two dietary treatments. Average litter size was higher at birth, 21 and 42 days for gilts fed sorghum grain vs those fed wheat diets. Little difference was noted in individual birth weights between treatments, but pigs were significantly heavier at 21 and 42 days for those nursing gilts fed sorghum grain. Litter birth weight was also higher for gilts fed sorghum grain. In two of the three seasons, significant decreases in average litter weight at 21 and 42 days were observed for pigs from gilts fed wheat. Significant decreases in gestation weight gain and less weight loss during lactation was observed for gilts fed wheat in two of the three seasons. This resulted in a significant treatment x season interaction for litter weight at 21 and 42 days, weight gain during gestation and weight loss during lactation. The reasons for the reduced reproductive performance of the gilts fed wheat diets are not known.

(Key Words: Wheat, Sorghum Grain, Gestation, Swine.)

Introduction

Interest in wheat as a swine feed depends largely upon the price relationship between wheat and other cereal grains. There have been periods in recent years when wheat has been competitively priced with other cereal grains, justifying its use in swine diets. When wheat becomes competitively priced with other cereal grains, it becomes especially attractive to Oklahoma pork producers, since Oklahoma is a major wheat producing state. Wheat production in the state ranges from 150 to 225 million bushels annually. However, reduced performance has been reported feeding soft winter wheat to brood sows. Bryant et al. (1985) reported sows fed soft winter wheat farrowed significantly less total

¹Regents Professor, ²Professor, ³Assistant Professor, ⁴Graduate Student,
⁵Herd Manager

and live pigs per litter than those fed corn diets. Research investigating the effects of feeding hard red winter wheat grown in Oklahoma on reproductive performance in sows was not available. Thus, this study was initiated to compare hard red winter wheat to sorghum grain as an energy source in gilt gestation diets.

Materials and Methods

A total of 264 crossbred gilts mated to crossbred boars (1986 Fall, 1987 Spring and 1987 Fall) were randomly allotted to the two dietary treatments. A control sorghum grain-soybean meal diet and a hard red winter (TAM-101 variety) soybean meal diet was fed in all three seasons (Table 1). The diets were

Table 1. Composition of experimental diets.

Ingredients, %	Gestation diets		Lactation diet
	Sorghum	Wheat	
Sorghum grain	81.20	---	77.80
Wheat, hard red winter	---	85.30	---
Soybean meal, 44% CP	14.40	10.40	17.80
Dicalcium phosphate	1.75	1.55	1.70
Calcium carbonate	1.05	1.15	1.10
Salt	.35	.35	.35
Vitamin-trace mineral mix ^a	.25	.25	.25
Chlorotetracycline	1.00	1.00	1.00
Total	100.00	100.00	100.00
Calculated composition			
Metabolizable energy, kcal/lb	1370	1411	1371
Protein, %	13.65	14.98	14.83
Lysine, %	.62	.62	.72
Calcium, %	.85	.85	.85
Phosphorus, %	.65	.65	.65

^a Supplied 800,000 IU Vitamin A, 80,000 IU Vitamin D, 3,400 IU Vitamin E, 4,000 mg d-pantothenic acid, 5,400 mg niacin, 800 mg riboflavin, 660 mg menadione, 4 mg Vitamin B12, 80,000 mg choline chloride, 18 mg selenium, 5 g manganese, 18 g zinc, 18 g iron, 2 g copper and 36 mg iodine per lb of premix.

^b Supplied 200 g chlorotetracycline per ton of feed.

formulated to be equal in lysine, calcium and phosphorus. Metabolizable energy and other nutrients were similar in both diets.

In all seasons, gilts were housed outside in dirt lots during gestation and group fed 5 lb of feed per head per day. At day 110 of pregnancy, gilts were moved to individual confinement farrowing crates and litters were penned separately until weaning at 42 days. Beginning at day 110, all gilts were fed a common lactation diet (Table 1) at a rate of 4.5 lb/day until farrowing. After farrowing, the gilts were self-fed the lactation diet for the duration of the 42-day lactation. Pigs had access to creep feed from 21 to 42 days of age.

Results and Discussion

Dietary treatment effects on litter size at birth, 21 days and 42 days; individual pig weight at birth, 21 days and 42 days; and litter weight at birth is presented in Table 2. No significant season interaction with these traits was observed.

Average litter size was greater at birth ($P<.06$), 21 days ($P<.09$) and 42 days ($P<.14$) for gilts fed sorghum grain vs those fed wheat diets. Little difference was noted in individual birth weights between treatments, but individual pigs were heavier at 21 and 42 days ($P<.08$ and $P<.03$, respectively) for those nursing gilts fed sorghum grain vs those fed wheat diets during

Table 2. The effects of grain source on reproductive performance of gestating gilts.

Item	Sorghum grain gestation diet	Wheat gestation diet	Level of significance
No. litters	143	121	
Litter size			
Birth	9.83	9.28	.06
21 days	8.19	7.73	.09
42 days	7.92	7.52	.14
Pig weight, lb			
Birth	3.35	3.29	
21 days	11.22	10.78	.08
42 days	23.70	22.56	.03
Litter weight, lb			
Birth	32.70	30.08	.01

Table 3. The effect of grain source on performance of gestating gilts within season.

Item	Farrowing season					
	1		2		3	
	(1986 Fall)		(1987 Spring)		(1987 Fall)	
	Sorghum	Wheat	Sorghum	Wheat	Sorghum	Wheat
No. litters	53	36	46	40	44	42
Litter weight, lb						
21 days	84.36	85.31	95.61 ^a	80.26 ^b	94.31 ^a	79.98 ^b
42 days	188.97	189.45	199.02 ^a	162.71 ^b	173.75 ^a	151.40 ^b
Gestation gain, lb	122.86	121.74	117.04 ^c	104.56 ^d	119.11 ^a	95.65 ^b
Lactation loss, lb	7.76	13.38	18.39 ^c	.90 ^d	20.90 ^a	-3.00 ^b

a,b Means in a row with different superscript within season differ ($P < .01$).

c,d Means in a row with different superscript within season differ ($P < .05$).

gestation. Litter weights at birth were also higher ($P<.01$) for gilts fed sorghum grain than those fed wheat diets during gestation.

A treatment x season interaction was observed for litter weight at 21 days ($P<.05$), litter weight at 42 days ($P<.08$), weight gain during gestation ($P<.05$) and weight loss during lactation ($P<.05$). Thus, this data is presented by season in Table 3.

Significant decreases in average litter weight at 21 and 42 days ($P<.01$) were noted for pigs from gilts fed wheat vs those fed sorghum grain in seasons 2 and 3. Similar average litter weights at 21 and 42 days were noted for the two dietary treatments during season 1.

Significant decreases in gestation weight gain ($P<.05$) were observed for gilts fed wheat diets in seasons 2 and 3 as compared to those fed sorghum grain during gestation. Similar weight gains were noted during gestation for the two dietary treatments during season 1.

Lactation weight loss was ($P<.05$) greater for gilts fed sorghum grain during gestation than those fed wheat for seasons 2 and 3. Gilts fed wheat during gestation in season 3 actually gained an average 3.0 lb during the 42-day lactation. No significant differences were noted for average lactation weight loss between the two treatments in season 1.

The reasons for the decreased reproductive performance of the gilts fed wheat during gestation when compared to those fed sorghum grain is not understood. The wheat diet was calculated to be equivalent in lysine and other essential amino acids, calcium and phosphorus. The wheat diets had a calculated higher level of metabolizable energy and crude protein (Table 1). Bryant et al. (1985) reported similar results when comparing soft winter wheat to yellow corn in gestation diets. They had no explanation for this occurrence.

Literature Cited

- Bryant, K.L. et al. 1985. Supplemental protein for swine. II. Influence of supplementation to corn and wheat based diets on reproductive performance and various biochemical criteria of sows during four parities. *J. Anim. Sci.* 60:145.