Barrow, Gilt Comparisons -- Gains and Carcass Composition at Various Ration Protein Levels

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Many studies have reported that barrows gain more rapidly than gilts, but gilts excell in carcass muscling and trimness. Recently, considerable interest has been directed toward determining ration protein needs of barrows compared to gilts, with a strong possibility that these protein needs differ. If this is true, feeding barrows and gilts separately may be recommended.

Procedure

This information was collected on a study comparing various sorghum grain -- soybean meal ratios so as to supply rations containing 13%, 16%, 20% and 20% protein plus 0.142% dl methionine. Protein level was not adjusted as pigs became heavier. Rations fed are presented in Table 1 of the previous report. Calculated methionine and lysine levels in the rations and requirements for these two amino acids are given in Table 2 of the previous paper.

A total of 64 Duroc pigs, four barrows and four gilts from each of eight litters, was selected and one barrow and one gilt from each litter were assigned to each ration. Gilts and barrows on each treatment were group fed, with either four gilts or four barrows in a pen.

Pigs were individually taken off test and slaughtered in the Animal Science and Industry Department meat laboratory when reaching about 210 pounds live weight.

Carcass and muscle quality information was collected by standard methods.

Results

Feed and Gain Data

Feed and gain comparisons between barrows and gilts are presented in Table 1. No significant differences were found after the first 70 days on test. Perhaps both barrows and gilts were still in a state of muscle and bone development throughout this period of time.

For the entire feeding period, barrows gained faster, consumed more feed per day and showed a more satisfactory feed/gain ratio. Barrows tended to consume more protein per day, but the amount of ration protein per pound of gain was not different between barrows and gilts.

Carcass Composition

As would be expected because of information from many previous reports, gilt carcasses were longer, carried less backfat, showed greater loin eye area and had a higher proportion of their carcass in ham plus loin, four lean cuts and five primal cuts. They also had a greater ham-loin index. The only surprising result was the higher dressing % for gilts in spite of greater finish on barrow carcasses.

Since gilts consumed a similar amount of ration protein per unit of gain and gilt carcasses, pound for pound, were trimmer and more muscular, gilts would appear to convert ration protein into muscling more efficiently.

Muscle Quality and Related Factors

When ham butt surfaces were visually scored for color and firmness, hams from gilt carcasses were less firm. No difference was encountered in color, firmness or marbling scores of pork loins.

The significantly greater shear force value of gilt carcasses indicates less tender muscle, but the average shear force value of both barrows and gilts is well within an acceptable range.

The expressible water % of the loin eye muscle from gilt carcasses tended to be greater. One would expect this to be associated with greater chilling weight loss (shrink), greater drip loss in thawed frozen products and reduced yields after exposure to heat. However, the cooking loss of broiled loin eye muscle was not different between barrows and gilts.

Sex-Ration Interactions

The performance of barrows and gilts on each of the protein levels studied is given in Table 4. Barrows tended to make most rapid gains while receiving the 13% protein ration whereas gilts gained more rapidly on the 16% protein ration. Barrow feed/gain ratio was quite similar for pigs fed 13 and 16% protein, but gilts made most efficient gains on 16% protein rations.

Barrow carcasses appeared to carry the least backfat when receiving 16% protein compared to 20% for gilts. Barrows also seemed to exhibit maximum muscling when receiving the 16% protein ration as shown by such criteria as loin eye area, % ham and loin of carcass, % 4 lean cuts of carcass and ham - loin index. Gilts achieved the maximum muscling at the 20% ration protein level.

Table 1. Barrow, Gilt Comparisons of Feedlot Performance

(Sex Means -- Rations Combined)

Item	Barrows	Gilts
No. of Pigs	32	32
70 Day-Daily Gain, lbs.	1.47	1.38
70 Day-Daily Feed Intake, lbs.	4.78	4.60
70 Day-Feed/Gain Ratio	3.27	3.33
Age at Slaughter, Days	177	187*
Total Days on Feed	92	102*
Live Empty Slaughter Weight, lbs.	199	198
Total Feeding Period		
Daily Gain, lbs.	1.61	1.42**
Daily Feed Intake, lbs.	5.45	4.95*
Feed/Gain Ratio	3.45	3.56*
Daily Protein Intake	0.94	0.85
Crude Protein/Gain, lbs.	0.60	0.61

* Barrows and gilts are different (Probability <.05)

** Barrows and gilts are different (Probability < .01)

Table 2. Barrow, Gilt Comparisons of Carcass Composition

(Sex Means -- Rations Combined)

Item	Barrows	Gilts
Chilled carcass weight, lbs.	142.3	143.8
Dressing %	71.3	72.5**
Carcass Length, inches	28.3	28.9**
Backfat Thickness, inches	1.32	1.18**
Loin Eye Area, 19th rib, sq. in.	3.71	4.19**
% of Carcass		
4 Lean Cuts	55.7	57.5*
Ham + Loin	37.0	38.7**
5 Primal Cuts	69.5	70.6*
Ham Loin Index	89.4	104.2**

* Barrows and gilts are different ($P<.05$)

** Barrows and gilts are different ($P<.01$)

Table 3. Barrow, Gilt Comparisons of Muscle Quality and Related Factors (Ration Means -- Rations combined)

	Barrows	Gilts
Ham Quality Scores		
Color[a]	2.9	3.0
Firmness[a]	2.9	2.7*
Loin Eye Quality Scores		
Color[a]	2.9	3.0
Firmness[a]	2.8	2.7
Marbling[b]	20.2	18.9
Shear Force Value, lbs.[c]	6.2	6.8*
% Expressible Water[d]	33.7	35.0
Total Cooking Loss, %[e]	30.0	29.5

[a] Color, Firmness scored using Wisconsin Special Bulletin #9. Higher value means darker, firmer lean.

[b] Marbling scored using U.S.D.A. beef marbling standards. 17= Modest, 23=Slightly abundant.

[c] Warner Bratzler shear value for cooked ½ inch core from loin chop.

[d] % Expressible Water using Centrifuge Method.

[e] % Total Cooking Loss for boneless, defatted loin eye muscle sample.

Table 4. Feedlot Performance and Carcass Characteristics of Barrows and Gilts Fed Varying Protein Levels and Added Methionine

(Sex Means - 2 trials combined)

Item	Barrows	Gilts
Total av. daily gain, lbs.		
13% C. P. (crude protein)	1.70	1.42
16% C. P.	1.65	1.54
20% C. P.	1.55	1.33
20% C. P. + methionine	1.52	1.40
Total feed/gain ratio, lb.		
13% C. P.	3.37	3.54
16% C.P.	3.31	3.36
20% C. P.	3.48	3.78
20% C. P. + methionine	3.64	3.57
Backfat thickness, inches		
13% C. P.	1.44	1.24
16% C. P.	1.30	1.21
20% C. P.	1.29	1.14
20% C. P. + methionine	1.25	1.12
Loin eye area, 10th thoracic vertebra, sq. in.		
13% C. P.	3.63	4.04
16% C. P.	3.74	4.12
20% C. P.	3.78	4.25
20% C. P. + methionine	3.69	4.36
Percent ham and loin of carcass		
13% C. P.	35.8	38.4
16% C. P.	37.6	38.1
20% C. P.	37.6	39.3
20% C. P. + methionine	37.1	39.1
Percent four lean cuts of carcass		
13% C. P.	54.1	57.2
16% C. P.	56.2	56.4
20% C. P.	56.6	58.4
20% C. P. + methionine	56.1	58.1
Ham-loin index		
13% C. P.	86.6	100.6
16% C. P.	91.4	102.4
20% C. P.	87.5	108.0
20% C. P. + methionine	92.0	105.9

This information tends to indicate that barrows have somewhat different ration protein level needs than gilts for maximum gains and for greatest carcass trimness and muscling. Where animal numbers merit, the swine feeder should consider feeding barrows and gilts separately so different ration levels may be fed.

SUMMARY

Sixty four Duroc pigs wereallotted to rations containing varying sorghum grain-soybean meal ratios so as to supply 13%, 16%, 20% and 20% protein + 0.142% added methionine. One barrow and one gilt from each of eight litters was assigned to each treatment and animals were individually slaughtered when they reached about 210 pounds live weight.

The following results were noted:

1. Barrows gained faster, consumed more feed daily and had a more satisfactory feed to gain ratio.

2. Gilts exhibited longer, trimmer, more muscular carcasses.

3. Crude ration protein consumed per pound of live weight gain was not different between barrows and gilts, therefore gilts were more efficient in converting ration protein into carcass muscling.

4. Visual scores of muscle color, firmness and marbling and objective tests of muscle quality such as shear force value, expressible water and cooking loss were not different enough between sexes to be a matter of concern.

5. In this study, barrows gained most rapidly at 13% ration protein and produced most desirable carcasses at 16% ration protein. Gilts gained most rapidly and efficiently at 16% protein but required 20% protein in the ration to produce maximum carcass meatiness.