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CORNHUSKER ECONOMICS

Energy Restriction During Breeding Gilt Development: An Economic Analysis

Market Report	Yr Ago	4 Wks Ago	2/26/10
<u>Livestock and Products,</u>			
<u>Weekly Average</u>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.....	\$81.15	\$83.63	90.00
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb. . . .	113.09	116.60	122.03
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	89.90	97.80	102.16
Choice Boxed Beef, 600-750 lb. Carcass.	133.30	141.40	149.62
Western Corn Belt Base Hog Price Carcass, Negotiated.	54.87	62.93	69.93
Feeder Pigs, National Direct 50 lbs, FOB.	53.00	*	70.22
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.	56.31	71.32	72.93
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.	96.63	*	*
National Carcass Lamb Cutout, FOB.	247.42	242.58	260.35
<u>Crops,</u>			
<u>Daily Spot Prices</u>			
Wheat, No. 1, H.W. Imperial, bu.	4.83	3.75	3.90
Corn, No. 2, Yellow Omaha, bu.	3.44	3.36	3.61
Soybeans, No. 1, Yellow Omaha, bu.	8.61	8.96	9.38
Grain Sorghum, No. 2, Yellow Dorchester, cwt.	5.09	5.30	5.71
Oats, No. 2, Heavy Minneapolis, MN, bu.	1.89	2.28	2.21
<u>Feed</u>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	190.00	135.00	135.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	77.50	87.50	87.50
Grass Hay, Large Rounds, Premium Nebraska, ton.	85.00	82.50	*
Dried Distillers Grains, 10% Moisture, Nebraska Average.	130.00	107.00	105.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	45.13	37.00	35.00
*No Market			

Swine production has increasingly become a low-margin business. As costs of production have increased, producers are continuing to increase efficiency in both market pig production and gilt development. Restricting energy during gilt development reduces feeding costs and can enhance some productivity measures, but can also negatively impact other areas of production. Thus, the net economic returns from a restricted energy gilt development program are unclear. This study utilized gilt development and market pig production data for two genetic lines of hogs, LWxLR (a cross between industry Large White and Landrace) and L45X (a Nebraska line selected 23 generations for increased litter size) from Johnson and Miller and Johnson et al., to estimate the returns to finishing market hogs using conventional and restricted energy gilt development programs.

An enterprise budget was developed to analyze the difference between gilt development programs. Most input and output quantities and biological performance data in the budget were from the original production study (feed consumed, ration compositions, sow and market pig cull rates, etc.). Average prices from 2004-2006 for corn (Omaha basis), soybean meal (Central Illinois basis), and market pig selling price (national net price) were used, along with other production costs (facilities cost, labor, veterinary expense, utilities, breeding cost, etc.) from Lawrence and Ellis.

The results from the budget analysis can be found in Table 1 (on next page). Progeny from energy-restricted dams, regardless of genetic line, incurred greater costs of production because of the greater numbers of market pigs in the restricted groups. However, the increased cost of production was offset by the greater reproductive production of energy-restricted gilts. Thus, offspring from energy-restricted gilts generated a greater amount of profit than their ad libitum counterparts.

Table 1. Revenue and Cost of Production for Two Prolific Maternal Lines

Item	Line					
	LWxLR			L45X		
	Ad Libitum	Restricted	Difference ¹	Ad Libitum	Restricted	Difference ¹
Total cwts	48.05	53.17	5.12	49.84	52.81	2.97
Produced (per sow)²						
Revenue (per sow)	\$2,387.31	\$2,641.45	\$254.14	\$2,476.05	\$2,623.85	\$147.80
Gilt Production (per gilt)						
Variable Costs	\$147.14	\$136.67	(\$10.47)	\$143.38	\$135.27	(\$8.11)
Fixed Costs	\$6.64	\$7.37	\$0.73	\$6.21	\$6.74	\$0.53
Total Costs	\$153.78	\$144.04	(\$9.74)	\$149.59	\$142.01	(\$7.58)
Market Swine (per litter through 4 parities)						
Variable Costs	\$1,348.70	\$1,497.08	\$148.37	\$1,419.11	\$1,527.81	\$108.70
Fixed Costs	\$294.15	\$322.04	\$27.88	\$314.35	\$332.90	\$18.55
Total Costs	\$1,642.86	\$1,819.11	\$176.25	\$1,733.45	\$1,860.70	\$127.25
Total Cost (per sow)	\$1,796.64	\$1,963.15	\$166.51	\$1,883.04	\$2,002.71	\$119.67
Profit/Loss (per sow)	\$590.67	\$678.30	\$87.63	\$593.01	\$621.14	\$28.13
Breakeven Selling Price (per cwt)²	\$37.39	\$36.92	(\$0.47)	\$37.78	\$37.92	\$0.14

¹ Restricted minus Ad Libitum² Liveweight Basis

In both genetic lines, energy-restricted gilts had a greater probability of reproductive success than ad libitum gilts. Results from the budget showed both LWxLR and L45X energy-restricted progeny generated greater profits than ad libitum offspring.

Restricted LWxLR market pigs had a \$0.47/cwt lower breakeven selling price than ad libitum LWxLR progeny, while ad libitum L45X progeny had a \$0.14/cwt lower breakeven selling price than restricted L45X offspring (Table 1). These results seem contradictory, as one would expect that the gilt development program, which is producing market pigs cheaper per unit would be the more profitable gilt development program. However, energy-restricted gilts had greater reproductive production of 5.12 and 2.97 cwts for LWxLR and L45X gilts, respectively. Thus, the extra market pigs produced by energy-restricted gilts caused both genetic lines of energy-restricted progeny to generate a greater level of profits.

In addition to the deterministic analysis, the gilt development data from the previously mentioned studies were analyzed in a stochastic simulation experiment. A Simitar (Richardson, 2005) simulation engine was used to generate price data for corn, soybean meal, market pigs and sows, with the same means and correlations between price series as historical prices. The simulation engine was used to replicate 1,000 iterations of price data, which were then entered into the enterprise budget. The results were then analyzed as cumulative distribution functions, comparing profit/loss per gilt and breakeven selling price of progeny for each genetic line.

In the stochastic simulation, both LWxLR and L45X restricted progeny generated greater profits than their ad libitum counterparts in 94.8 percent and 79.8 percent of the iterations, respectively. Restricted LWxLR market pigs had lower breakeven selling prices than ad libitum LWxLR market pigs at all iterations, while ad libitum L45X progeny had lower breakeven selling prices than restricted L45X progeny in 89.7 percent of the iterations of the simulation experiment.

Although restricting energy during gilt development is more profitable in this study, producers need to understand there are other important factors that need to be considered before changing gilt development systems. First, restricting energy in developing gilts leads to an increased rate of culled animals during the development stage. Thus, a greater number of gilts at the beginning of the program would be required, leading to larger fixed costs incurred per developed gilt. This increase in fixed costs is more than offset by the decrease in feed costs when restricting energy, but could have practical implications for swine producers as more barn space would be needed to produce the same number of breeding gilts as the traditional method of gilt development.

Another important caveat to this research was that the energy-restricted gilts in the Johnson et al. studies were fed on the ground to regulate feed intake of each animal. Thus, if this method of gilt development were replicated by a producer, they would need the capability of regulating feed intake of each animal. If breeding gilts were developed in large pens (a common industry method), limit-feeding would not be possible because the

dominant animals in each pen would consume a disproportionately large amount of feed, thus shorting the nutritional requirements of non-dominant gilts. Therefore, if an energy-restricted gilt development system is utilized, smaller pens of gilts would be needed with a feed delivery system capable of delivering a specific, equal amount of feed to all gilts in the pen. Additionally, this method of gilt development would probably require a greater amount of management to insure each gilt was consuming the proper amount of feed. When feed intake is self-regulated by gilts, this concern does not exist.

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