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**KSU LEAN GAIN ASSESSMENT PROGRAM**

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**Summary**

KSU Lean Gain Assessment is a new program developed at Kansas State University to allow producers to assess the actual lean gain of their pigs under normal farm conditions. The procedure is inexpensive and relatively simple and provides information that will assist producers in monitoring their genetic progress. Additionally, farm-specific diets can be formulated to match nutrient levels with the actual genetic potential of pigs on an individual farm<sup>2</sup>.

(Key Words: Genetics, Nutrition, Lean Gain.)

**Introduction**

Consumer demand for lean, closely trimmed pork has increased steadily during the last 10 years. Packers are realizing the extra value of lean hogs that eliminate the need for excess fat trimming. Additionally, producers are understanding that producing hogs with excess fat is inefficient and expensive.

These facts have led to changes in the standard terminology of assessing pig performance and profitability. Daily gain, feed efficiency, and cost per pound of pork produced are being replaced by lean gain, lean

tissue feed conversion rate, and cost per pound of lean pork produced. Lean gain is defined as gain in carcass lean divided by number of days on test. Lean tissue feed conversion is the ratio of pounds of feed consumed divided by pounds of carcass lean produced. Cost per pound of lean pork produced is simply total costs divided by total pounds of lean produced.

Nutritionists are stressing the importance of feeding hogs to their "lean gain potential." Feed companies are designing feeding programs for "high lean gain" or "medium lean gain" genetics. Unfortunately, lean gain is impossible to predict visually. Because producers have not had an effective means of assessing the lean growth potential of their hogs, these feeding programs and nutritional recommendations cannot be accurately employed or fully utilized.

Producers must also ask the question: "Do I have the genetic base to compete in a lean value system in the future?" To assist in answering this question, the KSU Lean Gain Assessment program was developed. The KSU Lean Gain Assessment program is an inexpensive, relatively simple method of assessing the lean gain of an individual producer's hogs under normal farm conditions.

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### Reasons to Assess Lean Gain

- 1) It allows assessment of the genetic base of a swine herd to determine if a genetic change is warranted.
- 2) Farm-specific diets can be formulated to match nutrient levels to actual genetic potential of pigs.
- 3) It provides an accurate measure of genetic improvement. Lean gain can be re-assessed periodically to determine the improvement made in lean meat production in a specific swine operation.
- 4) It helps the producer determine market strategies.

### Information Needed to Determine Lean Gain

- 1) **Pig Identity.** Pigs must be ear notched for week of birth or litter to allow tracking through the production system.
- 2) **Initial Weight.** Initial weight must be obtained between 40 and 70 lb. The objective is to obtain the age and average weight of all pigs, while they are in this weight range. Randomly weigh approximately 10% of the pigs in the nursery phase to obtain an accurate estimate. This weight can be taken as pigs leave the nursery or at a set time during the nursery phase. The critical criteria to record at this time are initial wt, date weighed, and number of pigs with each ear notch represented in the group.
- 3) **Carcass Data.** Ear notches and date must be recorded when pigs are sold. The group of pigs for the lean gain assessment must be sold to a plant using the Fat-O-Meater™ probe. The closest plant using this probe is Farmland Foods at Crete, Nebraska. They have agreed to supply the Fat-O-Meater™ tapes with the needed carcass data. The carcass data include: hot

carcass wt (lb), backfat depth (cm), and loin eye depth (cm).

### Lean Gain Calculations

Lean gain/d can be determined using the following formulas.

$$\text{Lean gain/d} = \frac{\text{Carcass muscle} - \text{Initial muscle}}{\text{Days on test}}$$

- a) Initial muscle =  $-3.5 + (.44 \times \text{initial wt})$
- b) Carcass muscle (lb) =  $18.8 + (\text{HCW} \times .44) + (\text{LED} \times 2.11) - (\text{BF} \times 7.7)$

- Loin eye depth (LED) and back fat (BF) are measured in centimeters by the Fat-O-Meater™. Hot carcass weight (HCW) is measured in pounds.

- c) Days on test = Days from initial wt to market.

Example: A group of pigs had the following data:

$$\text{Initial wt} = 40 \text{ lb} \quad \text{Days on test} = 110 \text{ d}$$

Carcass measurements:

$$\begin{aligned} \text{HCW} &= 176 \text{ lb} \\ \text{BF} &= 2 \text{ cm} \quad \text{LED} = 6 \text{ cm} \end{aligned}$$

$$\text{Initial muscle} = -3.5 + (.44 \times 40 \text{ lb}) = 14.1$$

$$\text{Carcass muscle} = 18.8 + (176 \text{ lb} \times .44) + (6 \text{ cm} \times 2.11) - (7.7 \text{ cm} \times 2) = 93.5$$

$$\text{Lean gain/d} = \frac{93.5 - 14.1}{110} = .72 =$$

lean growth genotype

### How to Use Lean Gain Results

Listed below are lean gain ranges to categorize hogs as a low, medium, or high lean gain genotype. After the genotype is categorized, management decisions can be

made concerning genetics, nutrition, and marketing.

<u>Lean gain/d</u>		<u>Genotype</u>
< .6	=	Low
.6 to .75	=	Medium
> .75	=	High

**Genetics.** If results indicate that hogs have low or medium lean gain, the producer must decide whether to make a genetic change. Producers with pigs of a medium lean gain genotype may consider improved boar selection, whereas producers with pigs that have low lean gain may contemplate the need for repopulation with an improved genotype. Producers with pigs of a high lean gain genotype will be challenged to make further improvements.

**Nutrition.** Regardless of the outcome of the lean gain assessment, producers will be able to more accurately match their nutritional program to their genetic base. Producers with pigs with low or medium lean gain genotypes may want to decrease nutrient levels to the level of pig performance. Providing more protein or energy than the pig can use for protein deposition is expensive, will not improve performance, and may actually decrease daily gain. Thus, nutrient levels and diet costs can be decreased, while maintaining the same performance and carcass value.

If the test determines that genotypes are superior (high lean gain), nutrient levels can be

increased to match nutrient intake with lean gain potential. Ultimately, profits will be increased by enhancing growth performance and return-above-base because of improved lean product for the packer. For the example listed above (.74 lb lean gain), the producer may want to increase protein level of the diet and reevaluate lean gain to assure that the protein content of the diet was not limiting lean growth. Producers should work with their nutritionist and/or extension specialist to determine the appropriate nutritional changes.

**Marketing.** If a producer has pigs with superior lean growth, they should be marketed to a packer that rewards lean meat production and discounts fat accretion. Conversely, if lean gain is below average, selling on a live basis may be advantageous to avoid discounts these pigs would receive on a grade and yield basis.

#### **Costs of Program to the Producer**

The only costs to the producer for this program are small increases in labor and limited marketing opportunity for the load of pigs being used to determine lean gain. Extra labor is needed to ear notch pigs at birth, obtain initial weight, and record ear notches at market. The limited market opportunity results from the need for the pigs to be sold to Farmland Foods to obtain Fat-O-Meater data. At least 50 pigs should complete this program to accurately assess lean gain. The accuracy of the assessment is directly related to the number of pigs completing the program.