Incorporating Growth Performance with Youth Market Hog Shows[1]

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Introduction

Many of the market hogs exhibited by youth across the U.S. produce lean, heavy-muscled pork carcasses. Carcasses from these animals may be eligible for carcass price premiums, dependent upon the pricing grid of the given processor. Though the growth performance of a market hog has a huge influence on the economics of pork production, the judge of a conventional youth market hog show does not know how long it took that pig to reach a given weight and carcass merit.

In 1998, the Iowa State Fair 4-H swine show was the first to develop a "derby" pig contest, a market hog show which includes growth performance (Martin et al. 2004). The unique guidelines of this contest allow exhibitors to focus on not only the appearance of their pig but also its performance and value as a market animal produced for profit (Martin et al. 2004). Several Midwestern state fairs including Missouri, Minnesota, Illinois, Ohio, and numerous county fairs have since implemented similar programs to enhance the educational value of their youth swine show. These shows are offered in addition to the conventional youth market hog show.

Shows incorporating growth performance have proven to be very educational, industry-applicable programs that could work exceptionally well in states such as Florida with large youth swine exhibition programs but little commercial pork production.

How Does it Work?

Incorporating performance into a youth show begins with getting official weights of pigs prior to the feeding period. Show officials should make the dates and sites where initial weights will be taken available to interested youth exhibitors at least three months in advance of the weigh dates. This allows interested youth to purchase pigs of the proper weight and age range prior to the weigh date.

Initial Weights

The integrity of the initial weights are critical, thus all measurements should be taken on the same scales or on scales that have been verified for accuracy. Show officials or university Extension personnel should be present to ensure proper animal identification and accurate recording of initial weights. Animal identification is critical to ensure the pig weighed prior to the feeding period is the same pig that arrives at the fair. Pigs return home for the given feeding period after initial weights are collected.

1. This document is AN257, one of a series of the Department of Animal Sciences, UF/IFAS Extension. Original publication date January 2011. Reviewed July 2018. Visit the EDIS website at http://edis.ifas.ufl.edu.

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Determining Maximum and Suggested Minimum Initial Weights

Each show should establish a maximum weight for pigs on initial weigh dates. Pigs exceeding this initial weight will be disqualified from participation. When determining maximum initial weight of pigs, show management should consider the number of days in the feeding period to reach the industry acceptable target weight of 230 to 300 lbs (NPPC 2000) on the day of the show. Since older, heavier weight pigs will have a greater average daily gain (ADG) than lighter, younger pigs in the same stage of growth (Dritz et al. 1997), having a maximum weight will improve competitiveness between exhibitors.

Show management should use records from previous years to determine the expected ADG of pigs exhibited, then use the number of days in the feeding period and an ideal live weight to determine what the maximum initial weights should be. Maximum initial live weights from the Ohio (Moeller 2010) and Iowa (Baas 2010) State Fairs were modified in Table 1.

Table 1 was determined using the following estimations from the Florida 4-H Hog and Ham program. The mean ADG of all pigs within this group over the last four years has been 1.6 lbs/day. The 100-day feeding period occurs from May 1–August 10, thus heat stress has likely reduced growth performance. Most Florida county fairs occur from January to early April, thus the weather during the feeding period is milder. These factors lead to an estimated ADG for pigs over a 100-day feeding period of 1.75 lbs/day, and the ideal final live weight was estimated at 260 pounds. The mean ADG of pigs from the Florida 4-H Hog and Ham program was markedly lower than values from the previously mentioned Midwestern state fairs (Baas 2010; Moeller 2010). Therefore, the maximum initial weights in Table 1 were 40 lbs heavier than maximum weights from Iowa and Ohio.

Show officials would also be encouraged to develop a suggested minimum weight. This would only be a guideline as pigs with lighter initial weights would be allowed to participate. The calculations for suggested minimum weight were made using an estimated ADG for pigs over a 100-day feeding period of 1.75 lbs/day and a minimum, acceptable final live weight of 230 pounds.

Show management should carefully assess the percentage of heavy and lightweight pigs after each year to determine if the maximum initial weight should be changed in upcoming years to maximize the number of pigs with ideal market weights. Groups of pigs with few heavy and lightweight pigs are easier for show officials to market to pork processors.

At the Fair

After arriving at the fair, all pigs should be weighed by show officials and identification verified. Also, ultrasound can be used to evaluate fat thickness and loineye area.

Fairs have two options for how to incorporate the actual growth performance information into their market hog show. One option is to exhibit pigs by their ending weight and inform the judge of each pig's ADG to be used in the judge's decisions during exhibition. Show management can either give the judge a list of each pig's ADG or paint brand ADG values on the pig's back to inform exhibitors and spectators as well.

The other option is to exhibit pigs by a corrected initial weight. If fairs have multiple initial weigh-in dates, these weights would need to be standardized, establishing a corrected initial weight, as shown in Table 2. Fairs could then inform the judge of each pig's ending weight with a list or by paint branding the pigs ending weight on the pig's back. The differences in growth rate become more easily evident for judges, exhibitors, and spectators if fairs exhibit pigs by a corrected initial weight. For example, consider two pigs weighing 70 pounds, 100 days ago. If one has an ADG of 1.4 and the other 2.4, a 210 lb pig would actively compete against a pig that weighs 310 lbs.

Ideally, barrows and gilts should be exhibited in separate divisions due to innate differences in growth and carcass merit between genders (NPPC 1995; Latorre et al. 2003; See et al. 2004). Also, purebred pigs should ideally be shown in a different division than crossbred pigs, due to the genetic advantages of crossbred pigs for lean growth, due to heterosis (Lush 1945; Olson 2008). However, knowledgeable livestock judges should be aware of the differences between genders and breeds and should adjust accordingly with their decisions, if shown together.

Judges should be instructed not to discriminate against pigs weighing over 300 lbs, which commonly would receive heavyweight discounts, as this would defeat much of the purpose of rewarding superior growth.

Incorporating Data from Actual Carcass Shows

The Midwestern state fairs that incorporate growth performance with a youth pig show also have an actual carcass show, which evaluates lean quality, fat thickness, and loineye area from chilled carcasses. This is certainly the preferred method to assess carcass merit but is often a challenge for fairs with limited access to slaughter facilities. Fairs that have actual carcass shows can incorporate the results in different ways, with some recognizing carcass and live show winners separately and some combining live placing, ADG, and carcass data in a composite formula to establish overall winners.

What is the Value of Incorporating Growth Performance with Youth Market Hog Shows?

Creating Industry-applicable Contests

Incorporating growth performance with a youth hog show by itself will not provide for more contests or divisions within the show. The judge will simply use the growth data provided when placing classes. However, the ADG information collected could be developed into its own contest, rewarding exhibitors whose pigs excelled for ADG. Shows which collect ultrasound measurements can calculate a percentage of fat-free lean for each pig (Table 3) and reward exhibitors whose pigs reach a given percent lean. The ultrasound measurements can be combined with growth performance to calculate lean gain per day on test (Table 4) for each pig (NPPC 2000), which can also become a contest. This is an estimate of how efficiently a pig deposited lean pork during the feeding period. This is the most important measurement of market hog merit in pork production, without measuring individual feed intake, because it is an index of growth and percent lean, the two traits of primary economic importance. These contests would help exhibitors understand the efficiencies of the commercial pork industry.

Educating about Growth Performance and Lean Gain Per Day on Test

Using growth performance with market hog shows provides youth exhibitors a more thorough understanding of commercial pork production. It requires youth exhibitors to feed pigs to maximize growth, comparable to commercial pork production, rather than manipulating growth rate to feed pigs for a given weight endpoint.

Many fairs use ultrasound measurements to calculate percentage of fat-free lean but do not have accurate growth performance data to calculate lean gain per day on test. This calculation provides an opportunity for exhibitors and spectators to understand the inverse relationship between ADG and percent lean. For example, a pig with a very thin cover of fat would have a very high calculated percent lean; but if the pig grew slowly, it would have a mediocre lean gain per day on test. A fatter, but still acceptably lean, fast growing market hog would likely have a greater lean gain per day on test, and ultimately be more profitable to produce. This lesson could be especially educational in states with limited commercial pork production.

Rewarding Genetically Superior Animals

A conventional youth market hog show sometimes rewards the young people and families that are the most effective at feeding pigs for exhibition, rather than the pigs which are genetically superior. Shows that incorporate growth performance with market hog shows encourage all exhibitors to feed pigs with a common goal, maximizing growth. Therefore, it is more likely that pigs with superior genetics will be rewarded, rather than pigs offered a superior feeding regimen or production environment.

Conclusion

There are numerous states throughout the U.S. that have extensive youth swine exhibition programs but little to no commercial pork production. The focus of youth livestock shows should continue to be the educational value and industry application of the event if they are to remain relevant. Incorporating growth performance with youth swine shows gives excellent insight into commercial pork production by creating industry-applicable contests, providing opportunities for education about growth performance and lean gain per day on test, and rewarding genetically superior animals.

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Table 1. Example of proposed maximum and suggested minimum initial weights for fairs collecting initial weights of youth pigs on multiple dates.

Date of initial weight	Maximum initial weight, lbs	Suggested minimum initial weight, lbs	Days on test	Date of final weight
December 9	77	47	108	March 27
December 10	78	48	107	March 27
December 11	79	49	106	March 27
December 12	80	50	105	March 27
December 13	81	51	104	March 27
December 14	82	52	103	March 27
December 15	83	53	102	March 27
December 16	84	54	101	March 27
December 17	85	55	100	March 27

Table 2. Example of proposed weight correction factors for fairs collecting initial weights of youth pigs on multiple dates.

Actual initial weight, lbs	Weight correction factor, lbs	Days on test	Corrected initial weight, lbs
70	0	108	70
70	-1	107	69
70	-2	106	68
70	-3	105	67
70	-4	104	66
70	-5	103	65
70	-6	102	64
70	-7	101	63
70	-8	100	62

Table 3. Predicting percentage of fat-free lean using real-time ultrasound.

Equation for pounds of fat-free lean	Example	Calculation
-0.534		-0.534
+ 0.833 x Gender (Barrow = 1, Gilt = 2)	Barrow	0.833 × 1 (Barrow) = + 0.833
- 16.498 x 10th rib fat thickness, in.	0.70 in	16.498 × 0.70 = - 11.549
+ 5.425 x 10th rib loineye area, in^2	7.30 in^2	5.425 × 7.30 = + 39.603
+ 0.291 x live wt., lbs.	277 lbs.	0.291 × 277 = + 80.607
Total pounds of fat-free lean		108.96 lbs.
To estimate carcass weight, multiply live weight by 0.74		(277 × 0.74) = 204.98 lbs.
To convert to a percentage, divide total pounds of fat-free lean by estimated carcass weight and multiply by 100		(108.96 / 204.98) × 100 = 53.16 %

Table 4. Predicting lean gain per day on test.

Equation for lean gain per day on test
$\frac{\text{((Pounds of fat-free lean in market hog at ending weight) – (Pounds of fat-free lean in feeder pig at initial weight))}}{\text{(Days on Test)}}$
Equation for calculation of fat-free lean in feeder pig at initial weight
((0.418 x live wt., lbs) -3.650)
Example initial weight, lbs
70
Example calculation of fat-free lean in feeder pig at initial weight
((0.418 x 70) -3.650) = 25.61 lbs.
Example days on test
105
Example of pounds of fat-free lean in market hog from Table 3
108.96 lbs.
Example calculation of lean gain per day on test
$\frac{((108.96) - (25.61))}{(105)} = 0.7938$ lbs