

## Current Issues Affecting Youth Swine Shows

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This NebGuide addresses practices which have developed to enhance the appearance of a pig that is to be exhibited, but which may be detrimental to the commercial pork industry.

The original purpose of youth livestock shows was two-fold: 1) to provide an educational experience where young people could learn animal management practices, as well as personal/character development; and 2) to recognize the best animals in the industry. As the nation has evolved into a less agricultural society, fewer young people are entering careers in livestock production. Consequently, the need to learn animal management practices has declined. While youth livestock shows are still designed to recognize the best in the industry, the decline in the need to learn skills for animal management careers has, in some cases, shifted the emphasis in youth shows. Consequently, a “show” livestock industry has emerged, including a “show” pig industry. The “best” management practices in this industry, i.e. those that will produce pigs that do well in the showing, do not always coincide with the best management practices in the commercial swine industry. Furthermore, while some issues are common to the entire swine industry, they are more prevalent in the show pig industry. Although these issues can occur at all levels of youth livestock shows, they are typically more prevalent at large national shows than at local or county shows. Partly because of the media coverage that national shows receive, these issues have caused some observers to question the value of youth livestock shows today.

Youth livestock shows continue to serve two of their original purposes: providing an educational experience and helping youth develop life skills such as responsibility, trustworthiness, and respect. In addition, they help connect exhibitors to the agricultural industry; however, the animal issues must be addressed by those directly involved with the “show” industry. Otherwise, we face the prospect of losing public support for these shows. A review of the issues in the show pig industry follows.

### Meat Quality

Many factors affect eating quality of pork. All factors discussed here, except dehydration, are present to some extent

in the commercial swine industry; however, the problems are more prevalent with show pigs. Each of these factors can create meat quality problems, but in combination, the effects may be severe. Factors directly affecting meat quality include the stress gene and carcass traits of leanness and muscling. Dehydration and the inappropriate use of Paylean® also can affect meat quality, but will be discussed separately.

### *Stress Gene*

The “stress” gene is a common term used to describe a gene mutation that was first identified over 30 years ago, due to physical effects visible in hogs with the mutation. These hogs were identified as having Porcine Stress Syndrome (PSS), which is characterized by the pig’s inability to adapt to stressors such as physical exertion, transport, or fighting. Animals exhibit extreme nervousness and excitability. The inability to adapt often results in sudden death. If pigs survive until slaughter, the stress gene is associated with a higher yield of lean meat, but also poorer quality meat that is pale, soft and exudative (PSE).

Genetically, the stress gene is identified by the letter “N” which indicates normal or “n” which indicates the mutated form. Normal (“N”) is the dominant form. The animal’s genotype indicates which form of the gene was inherited. The three possible genotypes are:

1. NN: This represents a normal hog that is not affected by stress characteristics. The hog inherited a “normal” copy from both parents.
2. Nn: This represents a “carrier” hog – an animal that carries one copy of the stress gene. The hog inherited a “normal” copy of the gene from one parent and a mutated copy from the other parent. Although the “carrier” may appear normal, there is a 50 percent chance that the animal will pass the mutation on to any offspring.
3. nn: This represents a “homozygous mutant” or “stress positive” hog. Both copies of the gene are mutated. These animals will likely exhibit the traits of PSS. If used as breeding stock, they will pass the mutation on to any offspring.

It is well documented that stress positive hogs produce carcasses that are leaner and heavier muscled than normal hogs, and that carriers are intermediate in mus-

cling and leanness. Thus, at one time, “Nn” and “nn” sires were used in the commercial swine industry to capitalize on improvements in percent lean. However, research has shown that over 95 percent of stress positive hogs and 30-50 percent of carrier hogs produce PSE meat. This meat is very light colored, often almost gray or white, does not hold its shape and loses much of its moisture prior to cooking. The meat is undesirable because of appearance and inability to hold moisture. This results in a very dry cooked product.

Since genetic tests have become available to identify carrier hogs, it is believed that usage of these animals has declined commercially. In 1995, the swine National Genetic Evaluation Program evaluated more than 3,000 commercial pigs. Twelve percent were identified as carriers and approximately 0.2 percent were stress positive (Table I). In comparison, 40 percent of class winners and breed champions exhibited at the San Antonio Livestock Exposition and Houston Livestock Show and Rodeo in 2000 and 2001 were carriers and 4 percent were stress positive.

**Table I. Percent of hogs identified with different stress gene genotypes from a national production sample and a national youth show.**

	<i>National Genetic Evaluation Program</i>	<i>San Antonio and Houston Livestock Shows — Barrow Show class winners</i>
Percent normal (NN)	87.8	55.4
Percent carriers (Nn)	12.0	40.4
Percent stress positive (nn)	0.2	4.2

Steps have been taken to address the stress gene issue. The National Swine Registry (NSR) has implemented policies to prohibit exhibition of known stress positive or carrier animals at NSR-sponsored events and requires the stress gene status of A.I. sires be declared on all A.I. certificates registering litters. Beginning in July 2004, all sires must be stress negative for the pigs they sire to be registerable. Mirroring this change, some genetic companies are now stating in advertisements when boars are stress negative. Although these steps help address the issue, there are many hog shows not sponsored by NSR and most do not have guidelines on the presence of the stress gene. Furthermore, there are far more crossbred hogs than registered purebred animals exhibited in youth shows.

#### *Carcass Traits of Leanness, Muscle and Quality Indicators*

The problem of inferior muscle quality, which results in meat of poorer eating quality, is present in the commercial swine industry. Most hogs are marketed on a grid system which rewards carcasses with a high percentage of lean. Unfortunately, overemphasis on carcass leanness and muscle may reduce quality. Producers in Denmark and Great Britain have been very successful at increasing carcass lean, but have reduced intramuscular fat (marbling) below acceptable levels and face the problem of reduced eating quality. The National Genetic Evaluation Program reported a relatively strong genetic correlation between 10<sup>th</sup> rib backfat and intramuscular fat. This means that selection for decreased backfat also decreases marbling. A negative correlation was seen between loin eye area and marbling, which indicates selection for increased loin eye tends to decrease marbling.

The emphasis on leanness and muscle seen within the commercial industry is magnified in the show industry. The “ideal” fat thickness and muscle desired varies slightly among packing companies, but is most often in the range of 0.7-0.9 inches of fat and 5.0-8.0 square inches of loin eye area. Carcasses with less than 0.6 inches of fat are considered extremely lean, generally do not receive premiums, and in some cases are discounted for being too lean and having bellies that are unusable for bacon production. Average 10<sup>th</sup> rib backfat thickness among the show pig population is much less than in the commercial hog population. The Agricultural Marketing Service (AMS) branch of USDA reports an average of 0.74 inch backfat and 7.1 square inches loin eye area among all hogs slaughtered. In comparison, data from the 2002 Ak-Sar-Ben Youth Livestock Exposition Swine Carcass Show reports averages of 0.48 inches of backfat and 8.5 square inches of loin eye. Only 3 percent of the hogs shown in 2002 had over 0.74 inches of backfat and less than 2 percent had less than a 7.1-square inch loin eye.

While some may argue this indicates the superiority of show pigs, and thus the original purpose of recognizing the best in the industry is being accomplished, the question becomes “Are these really the best in the industry?”. If the commercial industry is not rewarded financially and is sometimes discounted for producing carcasses with extreme leanness or muscle, should the shows identify these animals as the best?

Another argument is that show pigs have always been better than commercial pigs. While this may be true for the top end of animals shown, it has not always been true for the average show pig. If the show industry is representative of the commercial industry, carcass data averages of shows should be similar to commercial averages. This was true in the past, but current data suggests that even the “average” show pig is not representative of the commercial industry. The question here is “Is the show industry less representative of the commercial industry than it has been in the past?”.

Looking back just 10 years, the National Pork Chain Quality Audit reported averages for backfat that were only slightly higher than for the Ak-Sar-Ben show pigs, and loin eye area and percent lean were nearly identical between the commercial industry and the show pigs (Table II). In contrast, 2002 data shows relatively large differences in all three categories.

Many carcass shows have stopped collecting muscle quality data over the past 10 years due to slowdowns in processing; however, data from the class winners and breed champions at the 2001 San Antonio Livestock Exposition and Houston Livestock Show and Rodeo indicate approximately 23 percent of barrow carcasses were disqualified due to quality problems. Carcasses are disqualified for failing *two* or more of the four minimum quality standards for loin muscle color, muscle firmness, marbling and fat firmness. Carcasses that fail to meet these standards have pale, soft, or exudative meat, inferior levels of marbling, or soft and oily fat. These shows also indicate a trend toward a higher percentage of carcasses being disqualified with each successive year. In contrast, the National Genetic Evaluation Program showed approximately 4 percent of pork loins were unacceptable due to pale color, 1 percent due to inferior marbling and 10 percent due to softness of the lean.

Muscle quality is an issue that must be addressed. The National Genetic Evaluation Program reported that breed

**Table II. Current and past carcass data averages for the commercial industry and a major youth show.**

	1992			2002		
	Commercial Average	Ak-Sar-Ben Carcass Show Average	Percent Difference (Show vs Com.)	Commercial Average	Ak-Sar-Ben Carcass Show Average	Percent Difference (Show vs Com.)
Backfat, in	1.10	0.95	14% leaner	0.74	0.48	35% leaner
Loineye area, sq in	5.7	5.6	2% smaller	7.0	8.5	21% larger
Percent lean	49.5%	49.6%	None	51.7%	57.4%	11%* higher

\*5.7 percent difference in calculated percent lean, divided by the commercial average

lines which produced more highly marbled lean also had more desirable palatability. Furthermore, increasing marbling levels increased flavor and juiciness. Research with consumers showed that they are more likely to buy pinker meat compared to paler colored meat. In taste panels, consumers clearly preferred pork chops with higher marbling levels and darker red color. These chops were rated as more juicy, tender and flavorful. If the show industry is producing hogs that consumers rate lower in these qualities, again the question becomes, “Are these really the best in the industry?”.

### Death Loss and Down Animals

#### Paylean® Use

Paylean® is a trademark name for the feed additive ractopamine which was approved for use by the Food and Drug Administration (FDA) in December 1999. Ractopamine alters how feed is used for growth by redirecting nutrients from fat synthesis toward muscle growth. Pigs fed ractopamine have more muscle mass in the loin and ham and an increased percentage of lean. The current industry recommendation is that Paylean® be fed for the last three to four weeks prior to slaughter at either 4.5 or 9.0 grams per ton. Dosages above 4.5 grams have little effect on performance or reduced backfat; but may result in slight increases in loineye area.

A possible side effect of ractopamine use is a higher incidence of downer hogs (hogs that go down and cannot get back up to walk). Commercially, ractopamine generally is not recommended if downer rates are 0.5 percent or more.

The potential increase in death loss and downer hogs is a public relations concern, as well as a marketing issue and packer concern. In the commercial industry, downer rates are higher among heavily muscled hogs. Because most show pigs are extremely heavy muscled, they are already susceptible to higher downer rates. When factors of high ractopamine levels, the stress gene and dehydration are combined, downer rates can become very high. Some major shows have experienced dead and downer rates as high as 40 percent (from the end of the show to the time when hogs were unloaded at the packing plant).

#### Dehydration

Pigs, like humans and other animals, need water to survive. Lack of water will lead to death much sooner than lack of food. Withholding water to shrink hogs back to a certain weight is unheard of in the commercial industry, but is not uncommon with show pigs. Because muscle is about 75 percent water, any factor that enhances muscle mass, including selection, the stress gene or Paylean® use, will increase the

need for water. At more than one major show, a pig has died in the showring because of dehydration and one or more other factors. Not only is this a loss for the individual exhibitor, but more importantly, it represents a negative experience for the general public watching the show. The perception may be the animal died because of the cruel practice of withholding water. This simply provides another reason for others to question the purpose of youth shows.

### Food Safety

#### Paylean® Use

In regard to show pigs, there are two concerns with Paylean®. The issue of downer and dead pigs was discussed previously. The other concern is whether the product is being used according to label. Using Paylean® according to label recommendations is completely acceptable for show pigs. Using Paylean® in any other way than specified on the label constitutes “off-label” use of the product, is illegal, and creates the potential for a food safety problem.

Some of the specific label restrictions that must be followed include the level at which it can be fed (4.5 to 18 g per ton), the weight of hogs it may be fed to (150-240 lbs), and that it cannot be fed undiluted or used as a topdressing. Using Paylean® at higher levels, for heavier hogs, or as a topdressing are all considered off-label use.

#### Residue Testing

Because of previous problems with animals from livestock shows, the USDA mandates more residue (drug) screening on show livestock, including show pigs, than is normally done with commercial livestock. Residues pose a food safety threat and can be caused by not adhering to withdrawal times or by using products at higher than specified levels or on species for which the product has not been approved (off-label use). The required additional testing of show animals not only costs the packer additional time and money to process the hogs, but it erodes consumer confidence, regardless of whether any residues are found.

### Clipping Show Pigs

An additional concern of packers that is unique to show pigs is clipped hair. While this new practice seems quite harmless, it is causing some concern among packers. Some packers have chosen not to bid on hogs at major shows and others are requiring that hair be at least one-half inch in length. Shorter hair is difficult to remove with standard de-hairing processes used in packing plants. This results in significant slowdowns

in processing due to manual labor required to either remove hair or change the procedure to skin carcasses.

Much different concerns about clipping are in regard to the live hog. To be clipped, most hogs must be restrained. This is often done using a snout snare, which then causes the pig to squeal. Also, pigs that are clipped extremely short are susceptible to sunburn. Both squealing and sunburns may create negative public perception.

### Summary

Many of the issues discussed here are interrelated. Any one issue or problem cannot be eliminated by addressing just one factor. For example, death loss cannot be addressed simply by eliminating the stress gene. On the positive side, this means that addressing one factor, such as the stress gene, will not only help on the death loss issue, but also on meat quality and other issues.

The issues of death loss and food safety also have the potential to create negative publicity about youth shows among the general public. For many years, 4-H and other youth shows have been held in high esteem. Youth shows provide an excellent means for adults and youth to work together and to help youth learn life skills and values. Integrity of the program is a necessary foundation for helping youth learn these skills and values. It only takes a few negative incidents to generate concerns about integrity. One report of a dead pig in the showing due to dehydration can cause the public to ask "What are these youth learning?". Conclusions might include that youth are learning to abuse animals, to break the law and to compromise the safety of our food supply. Even though occurrences of these problems represent only a very small percentage of overall participation, they compromise the integrity of the whole program. If integrity is compromised, the public may not support the programs financially, may not attend shows, and may no longer view youth shows as positive, character-building experiences. Without this support, it may be difficult to maintain youth shows as they are today.

Some may argue that the show pig industry represents only a minor part of the total swine industry in the United States, so there's really no cause for concern; however, it is estimated that 1,000,000 hogs are fed for exhibition each year in the United States. This is enough to have a significant impact on food production issues. Beyond that, the public relations aspect of youth shows cannot be underestimated. Youth shows serve as a "window" to agriculture for many consumers today, who will have no contact with agriculture, except through these shows. We must always present livestock projects in a positive manner to preserve opportunities for future youth.

The Livestock Show Manager's Association and other groups recently sponsored a National Swine Symposium to discuss and suggest ways to address these problems. No formal resolutions were made, but many options were discussed, including the following possible steps and solutions:

- Educational awareness of participants and advisors about these issues.

- Requiring tests for the "stress gene" and disqualification of positives and carriers.
- Establishing "no clipping" rules.
- Establishing some type of "watering rule" which could include automatic waterers in pens, alleys or at the scale.
- Implement "sale and disposal" fees to help cover the cost of dead and downer hogs and condemned carcasses.
- Eliminate market swine shows.

Youth shows are a way to teach life skills and lessons to young people. Although many tools, topics or subjects can be used to teach life skills, animals are excellent, because of the natural connection between young people and animals. However, we also must remember that this "tool" of a hog or steer or lamb is ultimately going to enter the food chain for consumers to eat. Many of the practices discussed in this publication have developed because we haven't always kept the purpose of developing the youth first and foremost, or because we've forgotten about the food chain. If we can keep both of these in mind, youth shows will continue to provide an excellent means to teach lifelong learning, character and self-confidence.

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