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ANIMAL AGRICULTURE INITIATIVE

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A Perspective of Stockpersons and the Humane Euthanasia of Swine

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Introduction

As farmers, you are one percent of our population who knows what it means to care for a living animal meant for food. You are able to extend compassion and respect to the animals in your care while making life and death decisions on a daily basis. A farmer's desire to see their animals prosper and doing what is right for the animal's quality of life can create a "caring-killing" paradox.

In this article, our intention is to provide our current perspective on humane euthanasia for swine. Which includes the role of the stockperson; the present choices available; research on human characteristics and coping strategies for the stockperson; and methods available toward evolving the perceptions swine euthanasia, so they are seen more as humane endings.

The Stockperson

A farm owner or employee, who works with livestock such as pigs, is considered a "stockperson." Notably, high quality stockpeople working in pig production raise the standard of animal performance and make the business more successful (1). Studies have shown that the successful stockpersons are conscientious, caring, eager to learn, humble, careful observers, empathetic, and have a positive attitude. All of these attributes correlate to both improved productivity and animal welfare.

Understandably, stockpersons whose work involves euthanasia of an animal, may experience significant levels of grief and/or distress. A considerable amount of research has been conducted among animal shelter workers, veterinarians, and other animal caretakers on their reactions to euthanasia. These studies have revealed reactions of anger, sadness, fear, guilt, depression and helplessness.

Surprisingly, there is limited scientific research on how the pig stockperson feels about the euthanasia process. One survey study (2) found that employees prefer a method of euthanasia that is perceived as less painful and stressful and were more accepting of the task as long as the animal appeared sick. Women and Spanish-speaking stockpersons were less positive on the task of euthanizing pigs. It is interesting that while most respondents of an employee survey did not have a problem performing euthanasia, the longer an employee's job duties included euthanizing pigs, the less willing he/she was to euthanize.

Experience would strongly suggest that people who enjoy working on farms and are respectful toward animals often have a difficult time making the timely decision to euthanize. Terry Whiting in an article for Livestockwelfare.com believes there are six human barriers to euthanasia: holding onto the faint hope of the animal recovering; ignorance; lack of training and equipment; lack of empowerment; shirking or repugnance of killing; and moral food conviction – an abhorrence of wasting an animal for use as food (3).

We wonder if the way that a stockperson is required to perform euthanasia might instill an inner psychological conflict. In psychology terms, this is known as cognitive dissonance, which is the mental discomfort experienced by an individual who holds two or more contradictory beliefs, ideas, or values at the same time (3). When this is experienced, individuals tend to become uncomfortable and they are motivated to reduce this dissonance, as well as actively avoiding situations and information, which might increase it. In euthanasia, one of the outcomes of this dissonance is that euthanasia, especially methods like Manual Blunt Force Trauma (MBFT) are performed incorrectly. With MBFT, frequently not enough force is used, or employees did not stay to monitor the pig afterward.

Because other employees are experiencing the same dissonance and are dealing with it in similar ways, these incorrect practices can become generally accepted in a farm's culture. This causes a deterioration in euthanasia practices that can go unnoticed because the change may not be easily recognized within the group of employees all sharing in the dissonance. Eventually, these practices can deteriorate to a point that we might be surprised or shocked to see "normal" industry practices on undercover expose.

Coping with euthanasia related stress

When dealing with this difficult but necessary task, it is very important, that managers create a barn culture where the stockpersons feel comfortable voicing their attitudes and those who are unwilling to perform euthanasia procedures on pigs should not be forced to do so. The stockperson may find it difficult to find others who can listen, without judgment. Often in barns, there is an expectation of "toughness" and stockpersons who struggle with euthanasia can fear being seen in a negative way or not successful in their work. Farm managers should observe their stockpeople for signs of this aversion or reluctant exposure to euthanasia, especially signs of dissatisfaction with the work or careless handling of pigs.

Individually, we all find ways of coping with the stress of euthanasia. A number of studies (5-8) have indicated the possible ways that employees and stockpersons managed that stress included:

- separation or avoiding euthanasia tasks
- wry humor
- recognition that euthanasia is humane, necessary and important
- gained competence and confidence through training that the euthanasia was done well
- a calling to a moral obligation to "do it correctly"

Stockpersons

Advances in science and technology continually provide new opportunities as well as new products, equipment and techniques for the swine industry. While the recognition of a sick animal may seem like

Appendix 1 ²⁹

METHOD	SUCKLING	NURSERY	GROWER/FINISHER	MATURE	INITIAL COST	ONGOING COST	SKILL	CONSTRAINTS
Controlled Blunt Force Trauma	X				N	N	M	Optimal for small pigs only
Carbon Dioxide	X	X			L	L	M	Optimal for small pigs only
Non-Penetrating Captive Bolt	X	X			M	N	L	Most Likely a 2 step process*
Veterinary Anesthetic Overdose	X	X	X	X	H	H	H	Requires Veterinary Oversight and Proper Carcass Disposal
Penetrating Captive Bolt		X	X	X	M	L	M	Most Likely a 2 step process*
Gun Shot		X	X	X	M	M	M/H	Firearm Usage
Electrocution-Head Only or Head to Heart		X	X	X	L	L	M	Adequate Equipment and Proper Power Supply Most Likely a 2 step process*

Appendix 1 ²⁹

The table illustrates suggested and accepted methods for humane euthanasia of swine. (N=none, L=low, M=medium, H=high).

Regardless of the procedure, staff must be properly trained on the use of equipment, proper restraint, maintenance, safety, and confirmation of insensibility and death.

(*) – In some instances, the initial method may only stun the animal and second step such as exsanguination (bleeding out), or pithing (physical destruction of the spinal cord by a rod or cane) may be required to fully euthanize the animal.

Appendix 2 ²⁹

Some proposed methods of euthanasia are unacceptable and include strangulation, drowning and using an air embolism. These methods do not comply with AVMA and AASV standards for humane euthanasia.

PROPOSED METHOD	USE	REASON
Strangulation	NEVER	UNACCEPTABLE
Drowning	NEVER	UNACCEPTABLE
Air Embolism	NEVER	UNACCEPTABLE
Non-Anesthetic Drugs	NEVER	ANIMAL MUST BE RENDERED INSENSIBLE FIRST
Anesthetic Drugs	NEVER	TOO COSTLY

“second nature” to some, it is not to others. Through proper training we can help the stockperson to establish on-farm protocols, decision trees, and “rules of thumb” on making the best decisions around euthanasia when the pig has little or no chance of recovery.

Training:

According to the American Veterinary Medical Association (AVMA), timely humane euthanasia is recommended for pigs when “death is a welcome event and continued existence is not an attractive option for the animal.” Some veterinarians have suggested that employees are not always properly trained to recognize when an animal is losing weight or getting sick. The following are “rule of thumb” characteristics may help stockpersons recognize when euthanasia should be considered:

- Inadequate or minimal improvement after 2 days of intensive care.
- Pigs may exhibit extreme weakness or inability to eat or drink.
- Severely injured or non-ambulatory pigs with the inability to recover.
- Suffering from any infection or disease which fails to respond to treatment.
- A 20-25% loss in total body weight resulting in a body condition score of 1.

The National Pork Board (NPB) and the American Association of Swine Veterinarians (AASV) have provided a very thorough publication entitled, “On-farm Euthanasia of Swine – Recommendations for the Producer” (written materials are available through NPB’s “pork store” or by contacting the Michigan Pork Producers Association office) which provides a description of 8 acceptable methods of swine euthanasia for pigs of different weights summarized in Appendix 1 (9). It should also be noted that there are proposed methods that should never be used as means of euthanasia. These unacceptable or unwise methods are presented in Appendix 2.

According to swine stockperson survey, employees viewed euthanasia training as beneficial especially when completed on-farm and by a company trainer. An effective preparation for training stockpersons on humane euthanasia requires a Euthanasia Action Plan on each farm to improve timeliness of euthanasia and reduce uncertainty in the method and skilled required for euthanasia. All individuals conducting euthanasia must be trained to be aware of the methods available, perform the techniques with care, efficiency and personal safety while avoiding additional fear or stress on the animal. If you are uncertain of your current practices and/or skills as a trainer or would appreciate an on-farm evaluation, contact your local veterinarian or extension agent for more information.

Demonstrate:

When choosing a tool, it must be kept in mind that each method of euthanasia has limitations and some have a degree of visual aesthetics that are unpleasant to operators/observers. It is important to choose the appropriate tool for these reasons when deciding on an individual on-farm method. For example, the practice of Manually Blunt Force Trauma (MBFT) is becoming less tolerated by consumers, customers and stockpeople of the pork industry. Sadler, Johnson and Millman have recently published an excellent overview of alternative methods to MBFT for piglets weighing up to 12 pounds (10).

Alternatives to MBFT include captive bolt methods. Based on recent studies, euthanasia of piglets during the farrowing and nursery phase can be conducted using a non-penetrating captive bolt method (NPCB) developed in conjunction with the University of Guelph

and Bock Industries. The barrel of the gun is placed flush on the frontal bone, between the eyes, in the direction of the tail. The conical shaped head of the bolt impacts the skull, without breaking the skin, causing concussion and brain damage, then retracts back to the original position. The tool, the Zephyr – EXL has been shown to be highly effective for euthanasia of both neonatal and older piglets up to approximately 20 lbs (11-13). This is an advantage of this technology as MBFT is not recommended for use on pigs that weigh more than 11 lbs. A penetrating captive bolt, such as the Blitz gun, is less preferable for use in young pigs due to concerns for operator safety and the unsightly open wound left by the penetrating captive bolt. The Zephyr-EXL allows for euthanasia of piglets in farrowing barns as well as those transitioning into the nursery (that weigh less than 20 lbs). Piglets classified as weak, lame, or having hernias at the time within the first 4 weeks of movement into the nursery are likely candidates for euthanasia.

Another advantage to the usage of Zephyr-EXL is that the stockperson can use a 2 shot approach until they are comfortable with the new technique, achieving rapid insensibility and brain death while minimizing pain and distress of the pigs. In one of the studies (13), 2 older piglets required a second or repeat application of the NPCB. Since the Zephyr-EXL does not require calibrating or reloading, the 2 shots can be fired quickly, with the second shot serving as a precaution to ensure sustained insensibility until death in 99.3% of pigs (13). The average cost of the Zephyr-EXL, with air compressor, is \$1300.00.

Another concern within the studies was the ability for the stockperson to properly place the NPCB gun flush against the skull while restraining the pigs. Recognizing the need for a restraining method that would reduce operator error and increase safety while using NPCB guns, farms within Alberta introduced a prototype restraining method that appears to calm the pig while allowing safe restraint. The restraint is modeled after the concept of slings. By using mesh, netting or fencing, the pig can be placed such that the belly is supported and legs are suspended. Based on our observations, the pig is both calm and restrained within the device (Photo 1, page 5) and the handler has adequate and safe access to the pig to conduct humane euthanasia with one or even two shots (Photo 2, page 5). For more usage information on the Zephyr: bit.ly/ZephyrTool

**Please note that the NPCB device in these photos are with a product similar to the Zephyr-EXL.*

Photo 1: Calm pig in simple restraining device
Photo 2: Safety for handler during procedure



Follow-up

The goal of euthanasia is that the loss of consciousness or sensibility which should occur within seconds. A pig is considered insensible (11) when they (Photo 3 a,b,c):

- Lack a blink response when either the eyelid or cornea is touched,
- Lack a response to a nose pinch
- Lack rhythmic breathing.

Our group has found that necropsies of euthanized pigs help to tell a story of the underlying conditions and allow a psychological justification that the work of euthanasia was required.

An integral factor to reduce stress includes supportive managers, owners and peers, allowing stockpersons the opportunity to examine stressful situations in a safe and confidential environment. Safe environments can only be achieved when there is an openness based on the culture and values of the employees and an exchange of ideas to ensure that the approaches adopted by the farms are relevant and accepted. As an industry, we communicate to consumers that “pig farmers care” - as farm managers we need to make sure that stockpeople know that “we care that you care.”

We must present humane euthanasia in a manner that is factual and sensitive. We (swine people) need to work to not only share our own concerns but also listen and address those of our colleagues and consumers. Just as the concepts of good animal welfare are never static; the swine industry is constantly collaborating and investigating new dynamic solutions to improve our knowledge and ability to best care for our pigs, including improved euthanasia techniques and support.

Conclusion

Despite their best efforts, stockpersons will encounter situations in which the best option for the pig is humane euthanasia. While industry-specific guidelines for humane euthanasia of swine do exist, the difficulty that a stockperson encounters lies in not only correctly identifying the compromised



Photo 3 (A, B, C)
Determination of insensibility using :
A) blink response
B) nose pinch
C) respiration rate

animal but also in deciding when and whether to treat or euthanize. We urge farmers to work with their veterinarian and employees to establish an on-farm euthanasia protocol for each phase of production to alleviate any questions or anxiety regarding proper euthanasia expectation. Several methods of euthanasia are available and accepted by the AVMA and AASV. Each method is unique and specific for distinct ages and phases of production and ensures a humane end of life. We must also support further and continued research into hiring and keeping the best stockpeople and continuing to seek production practices that ensure their well-being as well as the pigs for which they provide care. *Prosperity for all!*

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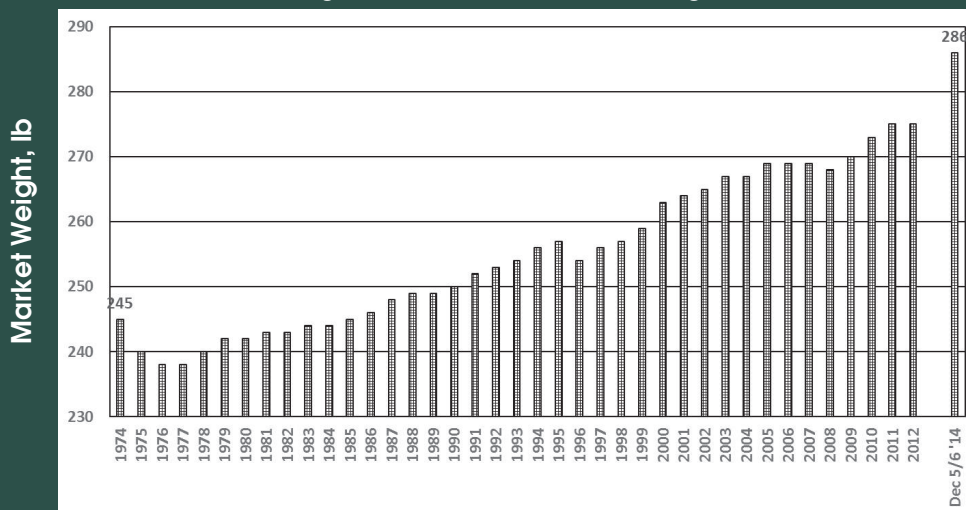
Contemporary Market Weights^a

By: Ronald O. Bates, MSU and Thomas Guthrie, MSUE

Introduction

Over the last year the pork industry has experienced and is recovering from an outbreak of a novel disease Porcine Epidemic Diarrhea virus (PEDv). For many farms that experienced PEDv, weeks of production were lost or drastically reduced. This severely cut supply which caused price to rapidly increase. During the summer of 2014 the industry witnessed record prices received for market pigs. With extra finishing space due to a reduction in pigs produced, a relatively mild summer which caused growth rate to be better than normally experienced during summer, and high market price, market weights increased to a greater degree than many would have foreseen. As average market weights reached and sometimes surpassed 285 lb, many have questioned if average market weights will continue to push higher or drop back to recent historical averages (Figure 1).

Figure 1. Historical Market Weights



Adapted from the National Pork Board Quick Facts

push higher or drop back to recent historical averages (Figure 1).

Over the last two decades lean growth and feed efficiency have dramatically improved at heavier market weights, which has resulted in pigs remaining profitable at heavier market weights. Most contemporary terminal cross pigs are profitable at heavier weights and with continued selection for improved lean gain and feed efficiency, pigs continue to be relatively lean at heavier and heavier weights. This article evaluates a few scenarios regarding the marginal profitability of heavy market weight pigs.

Evaluation Methods

Optimum market weights were calculated for three different scenarios with differing ration costs for the final ration to be fed to finishing pigs. An existing Excel™ spreadsheet tool from Dr. John Lawrence, Iowa State University was used and is available to pork producers on the internet at <http://www.ipic.iastate.edu/software>. In addition, the marketing information for an existing packer marketing matrix was used. The buying program used was considered to be more favorable for heavy weight pigs. Lean percent premiums and discounts along with possible sort loss were included in the calculations to determine results applicable to contemporary pork production.

Assumptions

To complete these calculations, commercial prices were solicited for the last ration to be fed before marketing with an estimated ration cost of \$225/ton. A similar evaluation regarding market weight was conducted in December, 2010 (Bates et al., 2011). As a reference, the cost of the last ration that was used in that exercise for 2010 (\$215/ton), was included (Figure 2).

^aReference to commercial products does not imply endorsement by the authors or Michigan State University.

In addition, an alternative priced ration for December, 2014 was also included (\$175/ton). The cost of the alternative ration was based on known differences occurring for ration costs across Michigan pork producer farms. Pig performance used in this evaluation is listed in Table 1.

Pigs were assumed to grow 1.88 lb per day, regardless of the final weight in which they were marketed. Pigs were not considered for marketing until they reached 258 lb. Furthermore, it was assumed that the decision to market pigs would occur in weekly increments. That is, if pigs were not marketed at a given weight, they would be held for an additional seven days. In addition it was assumed that space was not limiting, such that pigs could be marketed at any weight chosen without space concerns for the rest of the production schedule. Furthermore, it was also assumed that there would be a slight increase (0.3 percent) in the percentage of dead or downer pigs observed if pigs were marketed at heavier weights.

Marginal feed efficiency as pigs increased in weight was also estimated. Typically feed efficiency is measured from pig placement, either as a weaned pig or feeder pig, until reaching market weight. However, to determine optimal market weight it is critical to know what feed efficiency is from two different ages or weights that occur later in the growth phase (Figure 3).

Feed efficiency is illustrated in two ways. The first is that feed efficiency is calculated for the entire growth phase to different end weights starting at 220 lb. For instance, with an end weight of 220 lb feed efficiency, measured as pounds of feed per pound of gain, is approximately 2.5 for the entire growth phase. For an end weight of 290 lb, feed efficiency is 2.9 for the entire growth phase. The second way that feed efficiency is represented as marginal feed efficiency. That is the feed efficiency

Figure 2. Costs for the Final Finish Ration

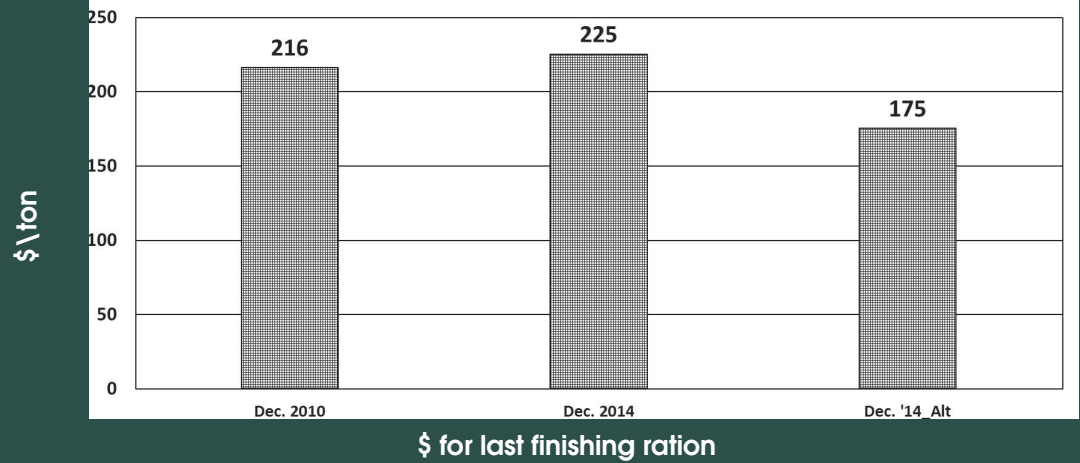
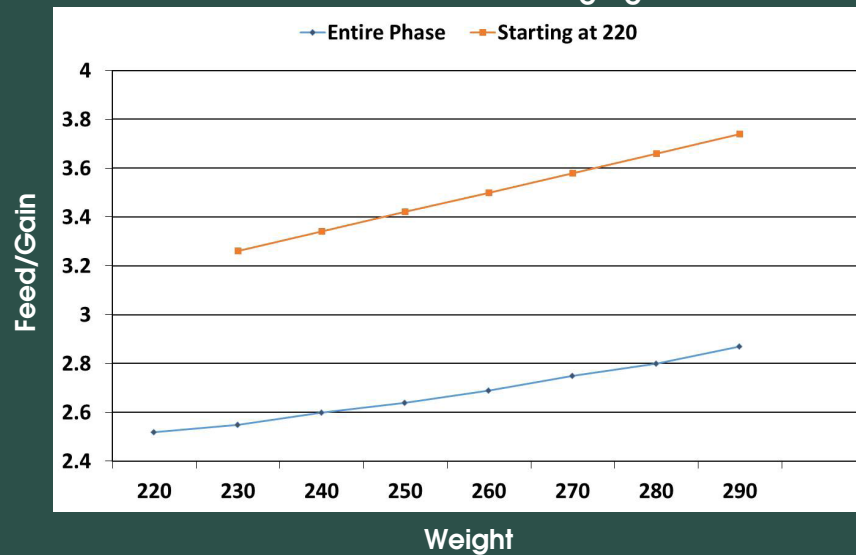


Table 1. Pig Performance Assumptions

Item	Value
Late Finishing Average Daily Gain, lb/day	1.88
Yield, %	75
Live Weight Base Price, \$	65
Base Lean Percentage @ 258 lb in 2010	55
Base Lean Percentage @ 258 lb in 2014	56
Opportunity Cost per Pig Space, \$	0.00
Downer/Dead %	0.3%

Figure 3. Feed/Gain and Marginal Feed to Gain for Finishing Pigs



between two different weights, regardless of the feed efficiency up to the initial weight. For instance the marginal feed efficiency from 220 to 230 lb is approximately 3.3 lb feed per pound of gain while from 280 to 290 lb; the marginal feed efficiency is approximately 3.7. Marginal feed efficiency was developed for each of the beginning and ending weights evaluated adapting results from previous research completed at Michigan State University (Edwards et al., 2006) and current industry averages.

Lean percentage also changed as pigs increased in weight. For example, the initial market weight evaluated was 258 lb with an estimated lean percentage of 56 percent. When pigs were held for an additional week, their subsequent end weight was 271 lb (Table 2).

Feed efficiency for the additional week, measured as feed/gain, was 3.54 and at marketing their percent lean was 56 percent. Utilizing a respective packer grid, no sort loss was in effect for 271 lb pigs. Moreover, each carcass achieved an additional \$2.54 per head in lean premium. Table 2 illustrates the information used for the evaluation completed in 2010. This was included to demonstrate that there has been favorable change over

time for percent lean and feed efficiency.

Table 2. Performance of Pigs Marketed at Increasing Weekly Market Weights

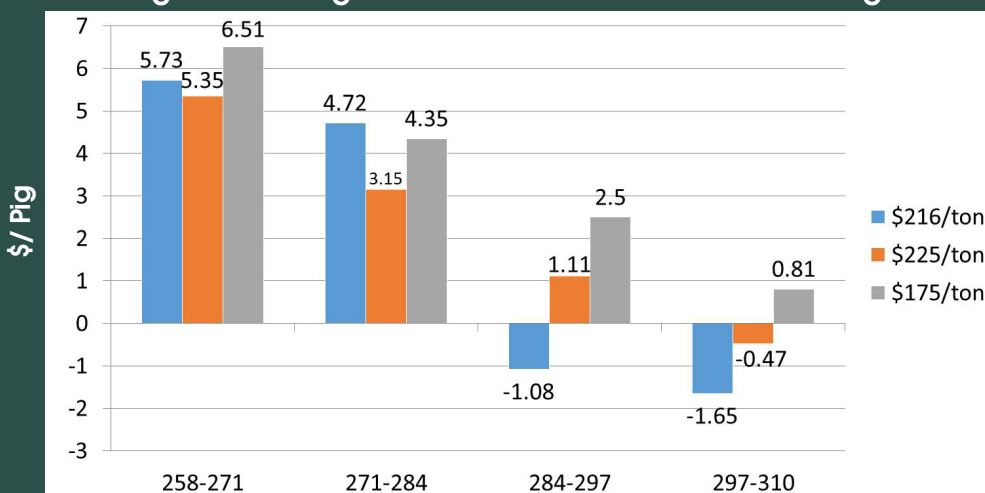
Item	Beginning Weight			
	258	271	284	297
ADG, lb/day	1.88	1.88	1.88	1.88
End Weight, lb	271	284	297	310
Lean, % in 2010	54.5	54.0	53.5	53
Lean, % in 2014	56	55.5	55	54.5
Marginal Feed/Gain in 2010	3.8	3.9	4.0	4.1
Marginal Feed/Gain in 2014	3.54	3.66	3.78	3.9
Yield, %	75	75	75	75
Change in Sort Loss, \$/head	0	0	-2.96	-3.25
Change in Lean Premium, \$/head in 2010	2.57	1.70	-0.99	-1.13
Change in Lean Premium, \$/head in 2014	2.54	0.54	1.67	0.58

Market Weight and Feed Price

The results of the three different feed price scenarios are shown in Figure 4.

The results are reported as the value change per head for pigs kept to the heavier weight. For example, for December, 2010 (\$216/ton), if pigs were marketed at 271 lbs. they would be worth \$5.73 more than if they were marketed at 258 lbs. For December, 2014, the pigs would be worth \$5.35 more per head at 271 lbs. than at 258 lb. For the scenario using the alternative priced ration for 2014 (\$175/ton), pigs sold at 271 lbs. would worth \$6.51 per head more than if they were sold at 258 lbs. The interpretation holds true for each category. In this analysis as long as the net variable return remains above \$0.00, then with all things being equal it is more profitable to sell pigs at the heavier weight.

Figure 4. Change in Value From Present to Future Weight



it was evident that pigs should be sold as they neared 284 lbs. However, using the 2014 assumptions pigs could be sold heavier and remain profitable. For the ration priced at \$225 per ton, pigs remained profitable until they neared 297 lbs. For the lower priced ration at \$175 per ton, pigs remained profitable at sale weights through 310

lbs. This implies that for the most part, even with relatively high priced feed and lower market price (\$65/cwt, live weight), it remains profitable to sell pigs at or above 300 lbs.

Optimum Weight when using partitioning agents

To further improve lean gain and feed efficiency, some producers use feed additives, such as Paylean™, marketed by Elanco. Paylean has been reported to improve growth, feed efficiency, lean percentage and yield. To effectively use Paylean, the ration, compared to typical finisher rations, must contain higher levels of amino acids to support the increased lean gain, which may add additional cost to the ration. To evaluate how a feed additive such as Paylean impacts the marginal profitability of selling pigs at heavier weights, a scenario was developed using both December, 2014 feed costs for the final ration. Table 3 shows the information used to complete this evaluation. Feed cost for the two final finishing rations were increased by \$25/ton to account for the inclusion of Paylean and increased levels of amino acids.

This evaluation was conducted differently than those previously discussed. Initial weight was 245 lbs. instead of 258 lbs., accounting for pig weight when Paylean was first included in the feed. In addition, average daily gain, feed efficiency, percent lean and dressing percent were adjusted to resemble what would be expected to occur when feeding Paylean over the four week scenario that was evaluated.

Figure 5 illustrates potential returns of this hypothesized Paylean scenario.

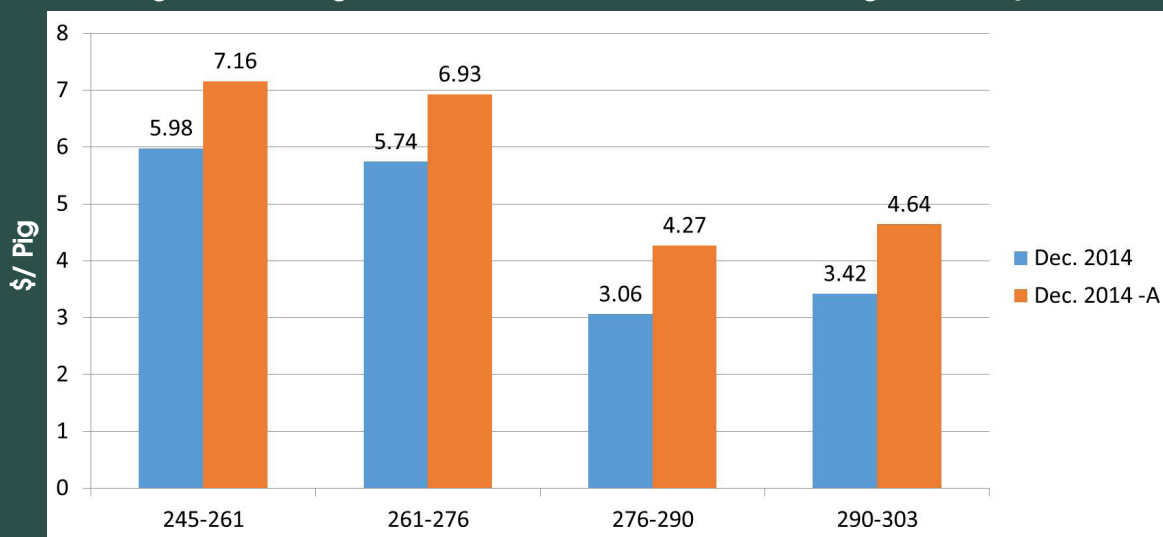
When feeding the Dec. 2014 ration at \$250/ton (\$225 +\$25), pigs at 261 lbs. were worth a net \$6 more head than at 245 lbs. The same was true for the rest of the increasing weight scenarios. Pigs marketed at 276 lbs. were worth \$5.74 more per pig than pigs at 261 lbs. Pigs weighing 290 lbs. were worth \$3.06 more per head than pigs weighing 276 lbs. and pigs weighing 303 lbs. were worth \$3.42 more per head than pigs weighing 290 lbs. When considering the alternative

Table 3. Performance of Pigs Marketed at Increasing Market Weights when fed Paylean™.

Item	Beginning Weight			
	245	261	276	290
ADG, lb/day	2.29	2.14	2.0	1.88
End Weight, lb	261	276	290	303
Lean, %	56.0	56.0	55.5	55.0
Feed/Gain	2.95	3.2	3.45	3.7
Yield, %	75.2	75.5	75.5	75.5
Change in Sort Loss, \$/head	0	0	0	-1.34
Change in Lean Premium, \$/head	1.95	2.50	0.54	2.86

Assumptions on Paylean performance from a summary of multiple studies. Cost/ton for the last finishing ration was increased by \$25/ton to cover the cost of additional nutrients and Paylean.

Figure 5. Change in Value From Present to Future Weight with Paylean



Dec. 2014 feed price of \$200/ton (\$175+25) the results showed that pigs at each increasing weight were worth more than the previous weight considered. This implies that when considering a conservative feed price and pig performance, pigs marketed at heavier weights remain profitable for pork producers.

Conclusion

Determining optimum market weight will differ from farm to farm. Marketing decisions should be based on lean growth potential, marginal feed efficiency through heavier weights, the packer grid in which market pigs are priced and space availability within the production system. With continued improvement in lean gain and feed efficiency to heavier market weights, market

weights will remain at or above current annual industry averages, unless there are extreme increases in feed prices or extreme declines in market price. Producers should carefully evaluate optimum market weights to improve profit potential and reduce risk.

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Summary of a Recent Evaluation of an AHP Disinfectant to Inactivate PEDv in Swine Feces

By: Madonna Gemus-Benjamin, Department of Large Animal Clinical Sciences MSU College of Veterinary Medicine

Recently the National Pork Board published a study on the use of Accel™ (Accelerated Hydrogen Peroxide® (AHP®)) in cold temperature environment (-10F) with both a heavy and light fecal load and at standing times of 40 and 60 minutes. A summary of those findings are as such:

1. Both concentrations (1:16 and 1:32) of AHP disinfectant in a 10% propylene glycol solution and both contact times tested (40 minutes and 60 minutes) inactivated PEDv in the presence of light and heavy fecal contamination.
2. When washing, disinfecting, and drying the trailer are not possible; using, at minimum, a 1:32 concentration of AHP disinfectant in a 10% propylene glycol solution with 40 minutes of contact time is an effective alternative to reduce the risk of PEDv transmission between groups.

An earlier controlled study performed by a research team at Iowa State University demonstrated that under simulated field conditions (those normally seen in swine trailers) Accel was able to kill 100 percent of the PEDv in the presence of both light and high (up to 25 percent) amounts of fecal matter. Other benefits include the fact that Accel is Hydrogen Peroxide based, therefore does not require the use of PPE when being applied, and is also environmentally friendly. Accel also acts as a cleaner and does not normally require a pre-cleaning step.

Accel is patented and manufactured by Virox Technologies Inc. Farm Guard Products (<http://farmguardproducts.com>). For more information, visit bit.ly/AccelStudy.

All comments and suggestions should be directed to the:

MSU Pork Team

Jerry May: Site selection and Environment
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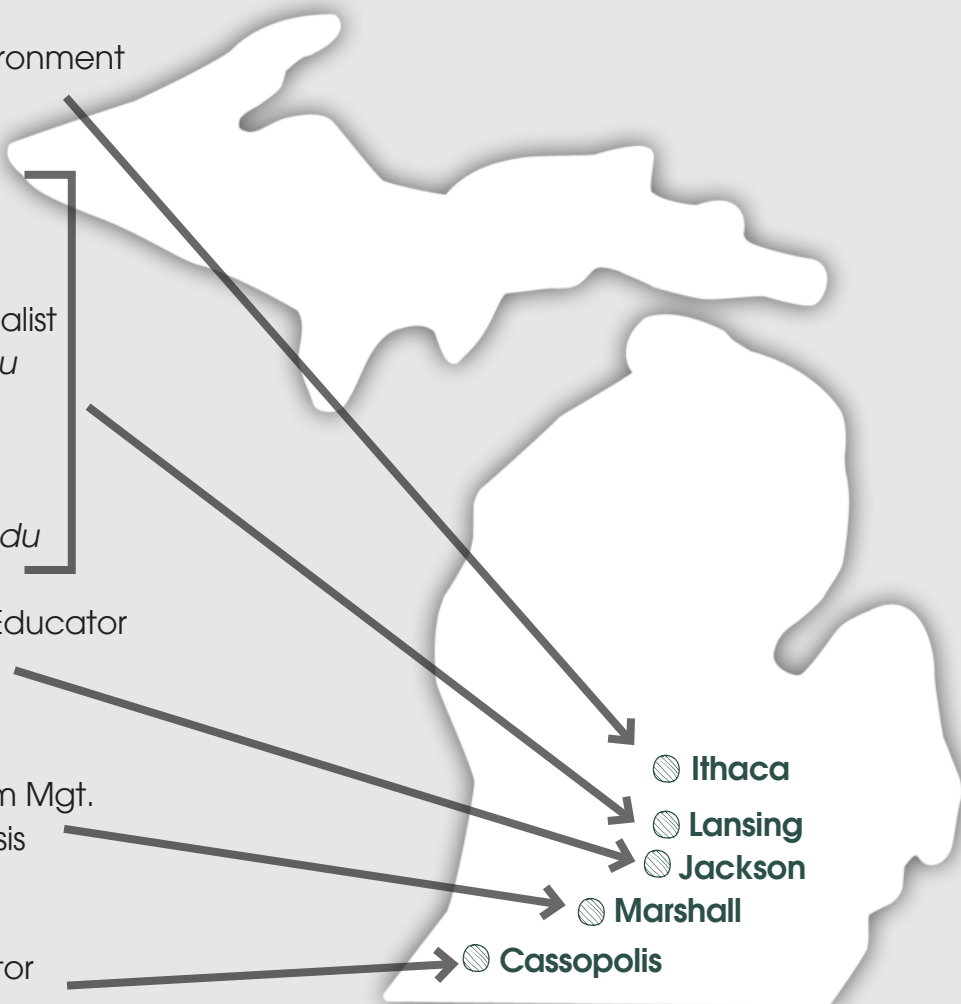
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