



Information for an Industry on the Move

June 2016

Vol. 21 No.2

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ANIMAL AGRICULTURE INITIATIVE

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Animal Caretaker Daily Duties

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The Michigan State University Extension (MSUE) Pork Work Group will provide 1 or 2 examples of PQA required Standard Operating Procedures (SOP), published in Pork Quarterly articles and available on the MSUE website. http://msue.anr.msu.edu/resources/pork_quarterly

PQA Version 3 requires that producers have written Standard Operating Procedures for specific areas of Pork production, including:

1. Animal caretaker daily observations
2. Handling
3. Piglet processing
4. Feeding and watering protocols
5. Treatment management
6. Needle usage
7. Biosecurity
8. Rodent control
9. Caretaker Training

Manuals and SOP's can be in paper or electronic form, but need to be accessible at the site.

SOP: Animal caretaker daily observations: There are numerous ways to execute this procedure. The following is a template that may be useful for creating standard operating procedures that best suit your farm. Feel free to edit or change procedures as you see fit.

The overall wellbeing of animals needs to be observed daily. Daily animal observations should be documented.

- Does the site have a written SOP for caretaker training?
- Does the site have documentation of annual

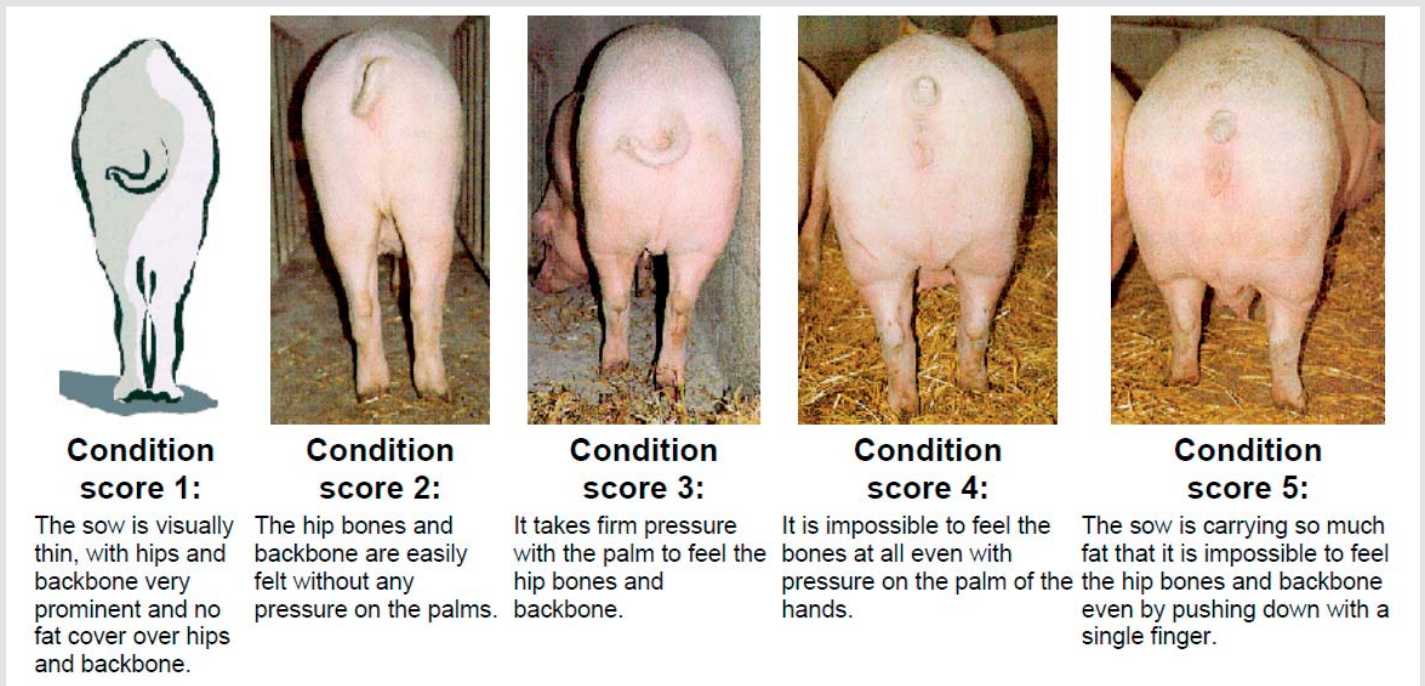


Figure 1. Photo credit goes to www.cqa-aqc.com/aca/documents/ACA-Appendix-10.pdf

caretaker training specific to their daily duties?

- Do all caretakers have a current PQA Plus Certification or are within 90 days from their new employment date?

It is extremely important that pigs are observed at least once daily. Doing so can help catch problems with the pigs or facilities early and decrease mortality numbers.

Caretaker training: How to observe compromised pigs.

Use the B.E.S.T. approach when observing animals for illness, injury, and general poor-doing.

- B= Body. Observe the body for any signs of damage, such as long, deep scratches or deep wounds. Observe the body condition of the animal. Check to see if any animals are arching their backs, as back arching is a sign of pain or skeletal deformity. Rumps should be free of diarrhea. Tails should be free of damage due to tail biting. Look at the bellies of pigs- bellies should not have any abnormal swelling, lumps, or bumps, and should appear well-fed and not tucked up or gaunt. Limb joints should be free from swellings and hooves should not have cracks, open sores, or other lesions. Animals should not be hesitant to move. Pigs should be breathing normally, and not thumping, open

mouthed breathing, or exhibiting other signs of labored breathing.

- E= Ears, eye, nose. Pigs should not have dull, sunken, or cloudy eyes. Eyes should not be red or appear otherwise inflamed. There should not be discharge coming from the eyes. There should not be discharge coming from the nose. Ears should be upright except in breeds with naturally droopy ears.

- S= Skin and hair. Sickly pigs may have fuzzy, dirty, hair and skin with a scaly appearance. Excessive redness and bald spots may be due to parasites. Greasy appearances are indicative of illness. Examine pigs for lesions, sores, or ulcerations along the shoulder and at the level of the joints. Check pigs for scratches greater than an inch and for deep wounds.

- T= Temperament. Typically pigs are highly curious animals and an absence of curiosity is concerning. Tails should be upright, indicating alertness. Healthy pigs that have had good caretaker interactions will approach caretakers inquisitively with their noses in the air. Tail biting, ear biting, or nosing bellies are all signs of not enough environmental enrichment.

Body Condition Score (BCS):

- Do 1% or less of the animals observed have a body condition score of 1?

- Have these pigs observed with a Body Condition Score of 1 been identified and receiving attention?

Figure 1. Pig body condition scores. Conditions between 3 and 4 prior to lactation are ideal. Low body condition scores (BCS of 1 or 2) can be due to either a lack of food, pain, or disease. High body condition scores can result in farrowing difficulties, low colostrum production, and lower milk production.

Lameness:

- Do 2% or less of the pigs observed show signs of severe lameness? Total number of breeding and non-breeding animals observed with severe lameness. Percentage of breeding and non-breeding animals with severe lameness.



Figure 2. Photo credit goes to www.pig333.com

Figure 2. Lameness indicates pain, and therefore is a serious welfare concern. Lameness can stem from injury, infection, or skeletal deformation. Pigs demonstrating lameness should be placed in a separate area to improve traction and allow them to eat and drink without competition. If the lameness is due to infection, consult treatment recommendations from the veterinarian, for appropriate treatment. Severe lameness scoring include those pigs which are non-weight bearing on the affected limb when standing or walking. Pigs with severe lameness that do not show signs of improvement after two days



Figure 3

of treatment should be humanely euthanized based on the Euthanization SOP.

Figure 3. Animals with bursitis (swellings near areas of bony prominences) or eroded bursitis. Bursitis can indicate improper flooring and insufficient bedding. Lameness may or may not accompany bursitis. Eroded bursitis can become infected.

Tail Biting:

- Do 5% or less of the pigs observed show evidence of tail biting in the herd?
- Have these pigs observed with evidence of tail biting been identified by caretakers and receiving attention?

Figure 1. Tail Health Assessment





	<p>Score 0: No damage</p> <ul style="list-style-type: none"> • No evidence of lesions (fresh or healed)
	<p>Score 1: Mild</p> <ul style="list-style-type: none"> • Healed and/or mild scratches/punctures • Not longer and/or wider than a pinhead ≤10 in total
	<p>Score 2: Moderate</p> <ul style="list-style-type: none"> • Scratches/punctures that are wider and/or longer than a pinhead, but smaller than a dime • Excessive (>10) mild scratches/punctures
	<p>Score 3: Severe</p> <ul style="list-style-type: none"> • As above with swelling and redness • Possible pus and necrotic tissue • Possible signs of cannibalism: lesions/loss of tissue dime-sized or larger <p><small>Adapted from Hunter et al., 1989</small></p>

Figure 4. Photo credit goes to nationalhogfarmer.com

Figure 4. Signs of tail biting, both mild and severe. Tail biting can be the result of competing for resources. Wounds resulting from tail biting can become infected and potentially lead to septicemia and death. When an outbreak occurs, identify the biter or inciting pig and remove injured pig(s). Check environment temperatures and pig lying behaviour to reduce drafts. If appropriate, hanging a 1” light link chain suspended from the ceiling and 5 inches above the flooring will provide a chew toy and distraction for pigs.

Vulva Injuries:

- Do 5% or less of the breeding herd observed have vulva injuries.
- Have these pigs observed with evidence of tail biting been identified by caretakers and receiving attention?



Figure 5. Photo credit goes to thepigsite.com

Figure 5. Vulva injuries in breeding gilts/sows. These injuries are generally caused by biting and can become infected secondarily. These injuries are commonly found in group sow housing. Severe vulva injuries may result in scarring, and can lead to farrowing difficulties. Severely injured sows should be moved to a separate pen for healing.

Rectal, vaginal, or uterine prolapses:

- Do 1% or less of the pigs observed have prolapses?
- Have these pigs overserved with prolapses been identified by caretakers and receiving attention?



Figure 6. Photo credit goes to www.veterinariadigital.com/

Figure 6. Rectal, vaginal, or uterine prolapses. There are numerous causes of rectal prolapse, including docking tail too short. Vaginal prolapse is uncommon and most often occurs in the 3rd

trimester of pregnancy. Uterine prolapse is most likely to occur within 24 hours after parturition takes place. Necrotic, untreated prolapses are a cause for immediate humane euthanasia.

Sores, wounds, shoulder sores, scratches:

- Do 10% or less of the pigs observed have scratches longer than 12 inches?
- Have these pigs observed with scratches longer than 12 inches been identified by caretakers and receiving attention?
- Do 5% or less of the breeding herd observed have shoulder sores?
- Have these pigs observed with shoulder sores been identified by caretakers and receiving attention?



Figures 7. Photo credit goes to ec.europa.eu and [The Pigsite](http://ThePigsite.com).

Figure 7. Fresh or scabbed over sores/wounds/shoulder lesions/scratches/deep wounds. Sores/wounds/scratches may be due to equipment or other pigs. Try to determine whether damage is done by equipment or lack of space (sores). Fix any equipment which is broken or has sharp pieces sticking out in a way which can injure pigs. Animals with shoulder lesions/sores due to rubbing indicate that some aspect of the animal's situation is suboptimal (feeding/housing/etc), indicate poor comfort levels, and suggest long term welfare issues.

Abscesses:

- Do 5% or less of the pigs observed have abscesses?
- Have the pigs observed with abscesses been identified by caretakers and receiving attention?



Figure 8. Photo credit goes to UF/IFAS Lee County Extension.

Figure 8. Abscesses are confined pockets of pus. Abscesses may be found below the skin, within organs, or within body cavities.

Abscesses below the skin can be observed visibly and by touch. Aural hematomas are also considered abscesses. Treat abscesses as guided by the farm's veterinarian.

Indoor facilities:

- Do pigs have a dry space to lie down?
- Do at least 90% of the pigs have adequate space allowance?
- Do pigs show thermoregulatory behaviors that indicate they are too hot or too cold and the air temperature at the pig level is outside the preferred temperature range for the phase of production? If so, has the caretaker taken appropriate actions to minimize heat or cold stress?

Figure 9. Excessive amount of manure (not mud) present on body (percentage of manure covering body). Pigs prefer to be clean. Large amounts of manure on body indicates that their environment is not adequate for allowing pigs to behave naturally. Pigs will lie in their excrement only if they are excessively warm or if they have too little space. Excessive amounts of manure can also

Figure 9. Photo credit goes to ec.europa.eu



pose as a health risk to animals and attract flies. Diseases such as Erysipelas

and PEDv have been known to re-infect farms when pigs are exposed to manure. Also, sows exposed to manure slurry during farrowing or breeding when the cervix is open, are more likely to contract bacterial disease. In the event of excessive amounts of manure on the pigs, check ventilation for proper air flow and recommended temperature settings. Check waterers for leakage or backed up manure pits and repair as needed.

**Thermal Comfort/
Air Temperature:**

Figure 10. Pigs huddling/piling due to too low of temperature.

Temperature guide based on floor type (please note that you must be aware of pig behavior and adjust accordingly).



Figure 10. Photo credit goes to ec.europa.eu

Weight of pig Kg	lbs	Straw Bedding		Concrete		Peforated Metal		Slatted °C
		°C	°F	°C	°F	°C	°F	
5	11	27-30	81-86	28-31	82-88	29-32	84-90	30-32
10	22	20-24	68-75	22-26	72-79	24-28	75-82	25-28
20	44	15-23	59-73	16-24	61-75	19-26	66-79	19-25
30	66	13-23	55-73	14-24	57-75	18-25	64-77	17-25
90	198	11-22	52-72	12-23	54-73	17-25	63-77	15-25

Thermal Comfort/Air Temperature Table: Information adapted from thepigsite.com



Figure 11. Photo credit goes to www.carrsconsulting.com

Figure 11. Pigs with visible signs of diarrhea. Numerous causes for diarrhea exist. Causes can include nutrition, disease, parasites, etc.



Figure 12. Photo credit goes to www.pig333.com

Figure 12. Young pigs with greasy pig demonstrate open sores. Greasy pig caused by *Staphylococcus hyicus*, may be more prevalent in start-up breeding herds and from sows unable to nurse correctly resulting in fighting among piglets, entry of the bacteria and open facial lesions. The preweaning survival rate is about 50%. Ensure the herd is mange free and follow treatment protocols. Ensure farrowing pens are disinfected between litters and dry at the time of farrowing. Ensure penning farrowing pens are in good condition and do not cause abrasions.

Caretaker animal observation protocol

- Caretakers need to observe pig body condition scores daily. Any animal with a BCS less than a 2 needs to receive immediate attention.

- Caretakers must observe pigs for lameness daily. Animals are lame when they cannot bear weight evenly. Lame pigs may be able to stand but reluctant to walk. Lame pigs may touch the toes of their lame leg to the ground but not actually bear weight.

- Caretakers need to observe pigs for tail bites daily. Tail bite wounds can lead to infection and possibly even death if not treated. Injured animals should be treated.

- If possible, the caretaker should attempt to ID tail-biting pigs and separate them if possible.

- Caretakers must observe the breeding herd for vulva injuries which result in bleeding, large open wounds, and/or infection. Treatment and separation from the group may be required for pigs with damaged vulvas.

- Caretakers must observe pigs for prolapses of the rectum, vagina, or uterus. Treatment and separation from the group may be required. Causes of prolapse includes piling for warmth, docking tails too close to the body, and coughing.

- Caretakers need to observe pigs for any deep wounds or any openings that go through the skin. Caretakers need to note any pigs with skin penetrating wounds and pigs with scratches that are 12 inches or longer in length. It should be noted that castration incisions and wounds from ear notching or tail docking are not included.

- Caretakers need to observe pigs, especially sows with body condition scores less than 3, for scabbed over or open sores.

- Caretakers need to observe sow and piglet units and make sure that sows have appropriate room. Sows need to be capable of lying completely on their sides without their heads touching feeders, and without their hind limbs touching the back of the stall. The size of sow stalls must not cause injury to the sows. Piglets and growing pigs need to be able to lie on their side easily, without touching another piglet, and without having their heads rest on feeders (without the split suckling area).

- Caretakers need to be able to observe thermoregulatory behavior exhibited by animals and which type of thermoregulatory behavior is ideal. Piling or huddling indicates that the temperature is too low. Animals that are widely spread apart indicates that the temperature is too high. Animals which are close but aren't huddling or piling indicates that the temperature is appropriate.

- A caretaker's daily observations will require that they can distinguish ill or disadvantaged animals from

healthy animals and must be able to manage the animals accordingly.

- Caretakers need to observe pigs for abscesses, and note if multiple pigs have abscesses. If multiple pigs have abscesses the caretaker needs to record the approximate location of the abscesses to determine if there is a common location where they are forming.
- Caretakers need to observe the percentage of manure present on animals. Animals should have less than 50% of their body covered in manure.
- Caretaker should observe pigs for fuzzy hair coats.
- Caretakers should observe pigs for gaunt bellies.
- Caretaker should observe animals for signs of coughing or labored breathing.
- Caretakers should observe animals for diarrhea/ signs of diarrhea (manure caked on the inside/back of the legs).
- Caretakers need to observe groups for non-ambulatory animals.
- Caretakers need to observe pigs for any signs of seizures.
- Caretakers need to identify and remove any dead animals.
- Caretakers must examine pigs for any missed boars, or boars with single testicles.
- All treatments must be recorded following company and PQA+ guidelines.

Equipment daily duties

- Automated feed systems need to be examined daily so that out-of-feed events do not occur.

- Floor slats need to be observed daily. Broken slats need to be repaired immediately to prevent lameness from occurring.

- Caretakers must examine groups to determine whether or not there is adequate space for feeding and enough waterers to permit pigs to consume their daily requirements without inducing excessive fighting and competition.

- Caretakers need to examine pens and alleys for any sharp objects or broken pieces of pens/equipment which could cause injury to pigs.

- Caretakers should examine all equipment on a daily basis and record any equipment needing repairs.

- Caretakers need to check the ventilation system on a daily basis to ensure that the barn is receiving proper air flow.

- Caretakers must check all rodent traps, ensure that the trap is emptied and re-baited, and that all traps match barn map locations.

Environment daily duties

- Caretakers must observe facilities for signs indicating high humidity (water dripping from pipes, wet floors, etc).

- Caretakers must observe that manure levels are at or lower than recommended levels.

- Caretakers must note if ammonia or other gas levels are too high. When ammonia levels are too high pigs will have watery, matted eyes, and may have difficulty breathing. If this is observed ammonia measurements must be taken and recorded. If the ammonia measurement is too high corrective actions must be implemented immediately.

- Caretakers need to observe the premise around barns as well as inside barns for debris, spillage of feed or manure, and signs of vermin.

Emergency response to manure spills – Are you prepared?

Part 2.

In the case of any spill, particularly manure spills, livestock producers should familiarize themselves with the 4 C's of Spill Response.

By: Shelby Burlew, Livestock Environmental Educator, MSU Extension

There are no simple solutions to a manure spill, but thinking through your specific situation, and monitoring daily can help prevent, or at least minimize, the environmental risks and potential regulatory issues. Emergency response to manure spills - Are you prepared? Part 1 (found in the March 2016 issue) detailed the importance of developing an emergency response plan in case of manure spills when manure is being stored, loaded, transported, or land applied. It is important to think through how you would respond to a number of possible spill scenarios and the best actions to take to protect nearby water sources and other sensitive areas. Michigan State University Extension recommends including the 4 C's of Spill Response in your farm's emergency response plan; control, contain, comply and clean-up.

Control: Eliminate the Source

In the case of any manure spill, stopping the source of the spill should always be one of the first steps of response. Every farm is different so the farm's response to controlling the manure spill will vary depending on the situation. What if manure is released from a lagoon or earthen basin? A simple answer may be to consider adding a clay-based soil to the berm to increase the elevation of the structure. What if a transfer pipe or other hardware breaks? Try plugging any lines or valves that are leaking. Separate pipes to create an air gap and stop the flow of manure. Stop all additional water/manure/grey water flow to the structure. What if the lagoon or earthen storage structure is leaking at the base or sidewall? Try plugging the holes with a clay-based soil. Consult a licensed professional engineer (PE) for assistance with any permanent repairs. These are just a few examples of the different scenarios and methods to controlling a manure spill.

Contain: Limit the Area Impacted

Once the flow of manure has been stopped, the spill must be contained to protect environmentally sensitive areas. Most importantly, how you react in the first 5-30 minutes will determine the eventual impact of the spill and any possible penalties. Important steps in containing a manure spill may include:

- Creating dams across streams, ditches or other drainage ways
- Plugging tile outlets or covering tile inlets
- Have a Manure Spill Response Kit handy

Comply: Assess and Report Damage

The next step in a spill response is to comply, or to assess and report any damages. It is very important to report a spill to the Michigan Department of Agriculture & Rural Development Agriculture Pollution/Spills Hotline 1-800-405-0101. If the farm is permitted with Michigan Department of Environmental Quality, the spill must be reported to either the MDEQ contact in the certificate of coverage or the Pollution Emergency Alerting System hotline 1-800-292-4706. Also, be sure to immediately report the manure spill to your county sheriff or local police.

Clean-Up: Restore the Affected Area

The last step in a spill response is to restore the affected area or clean-up. This includes having the provisions for emergency pumping and land application of manure (even when field or crop conditions would not normally be feasible). For example an emergency contact list would come in handy if you have manure in the ditch that needs to be pumped and land applied. Consider which fields are best able to handle manure without further damage to the environment or crop. Even with emergency manure application – application rates, methods of application and setback requirements must be recorded and followed.

Summary

Assess your risk, consider what the worst case scenario might be and think through a plan to address that situation. For example, knowing the down slope direction from the storage will help you know how critical the risks could be. Know how to get earth moving equipment on site immediately and plan where potential berms would need to be built to divert the flow from reaching surface waters, neighboring properties or roadways. Even when there are not imminent risks to surface waters, have plans in place to control, contain, comply and clean-up a manure spill.

The future of swine castration in the United States

Part One: The issue and alternatives

By: Dr. Sarah Ison, Department of Animal Science and Extension, MSU

This article is part of a two part series on swine castration. This part provides information on the issue of swine castration, what the current situation is for United States pork producers, and introduces the alternatives to physical castration. The article provides an overview from a consumer, producer and pig perspective.

The issue

Castration of male pigs is common practice in the US swine industry for two reasons: meat quality and pig behavior. Male pigs are castrated to eliminate “boar taint”, an unpleasant odor and taste in pork products associated with the production of androstenone, skatole, and indole, which increase as boars reach puberty at 4-6 months. Castration also reduces unwanted sexual and aggressive behavior, producing barrows that are easier to handle and manage as they approach market weight. The predominant method of pig castration in the United States is surgical or physical castration. Physical castration typically involves making one or two incisions to the scrotal sac, separating of the testes from surrounding tissue, and extracting the testes, which are then torn or cut at the spermatic cord [1].

There is increasing evidence that the act of physical castration is painful for the pig. Pain is not easy to measure, and animals may mask pain in certain situations. For example, a pig may not overtly express pain in the presence of a human handler. However, studies show that vocalization and the type and intensity of movements during castration differ from piglets that are handled alone, due to pain from the procedure [2-4]. Signs of pain seen following castration include tail wagging, huddling up, trembling,



stiffness, spasms and rubbing the wound on pen surfaces [3]. Other indications of pain include a reduction in feed intake and avoiding social contact with litter-mates [3,5,6]. Piglets also show an increase in the stress hormone cortisol, another sign of pain-related distress [4,7]. Additionally, the use of local or general anesthetic to block pain during the procedure, and pain relief drugs to reduce inflammation and pain after the procedure, reduced indicators of pain to some degree [3,6-16].

Societal concern regarding swine management practices has increased in recent years, resulting in the consumer-driven demand for changes to gestation sow housing in the US and globally. It is inevitable that, in the near future, concern over the use of painful management procedures in pigs will lead to a change in the use of physical castration. Evidence from other countries suggests that physical castration performed without anesthetic is considered ethically unacceptable by consumers [17] who preferred alternatives to physical castration [18]. Therefore, it is important for the industry to be aware of the potential changes with respect to this practice and be prepared to take action if, but more likely, when the need arises.

The United States is the third largest global pork producer and has almost a third of the world pork export shares. With regard to physical castration, the American Veterinary Medical Association (AVMA) recommend that it is performed between the age of 4 and 14 days, and no more than 5 days before weaning [19]. Beyond 14 days of age, the use of anesthesia and/or post-procedural pain relief is recommended and the AVMA encourage the development and implementation of alternatives to physical castration and the use of anesthesia and pain relief when performing castration. So, what are the alternatives?

Alternatives to painful physical castration

Raising entire males

Boars are more profitable with substantial performance and carcass quality advantages over physical castrates [20,21]. They are more feed efficient, eat less food, grow

faster and convert energy intake into weight gain more efficiently. This creates a leaner carcass (i.e. more meat) with lower back-fat compared with gilts and physically castrated barrows. The advantages of boars in relation to barrows has been summarized from several studies as: 1) up to 13% increase in growth rate; 2) eat up to 9% less feed; 3) up to 14% improvement in feed conversion (i.e. food to weight gain), and; 4) are leaner by 20% [21].

One option is to simply not castrate and raise boars. With this option, there is a risk of unwanted behavior and boar taint. The solution to this is to slaughter hogs before puberty, as breeding has increased growth rates, boars are reaching puberty at 220 – 240 lbs. at around 4-6 months. Slaughter plants must be equipped with fast and efficient methods to detect boar taint, to prevent tainted carcasses reaching the food chain, and impacting consumer acceptability of pork products. Accurate, cost-effective instruments to detect boar taint in slaughter plants are currently being investigated.



Another possibility is to raise entire males by breeding against boar taint or sperm sexing to produce only gilts. Sperm sexing is not economically viable for pork production as gilts are slower growing, and less feed efficient [22]. Research shows that the most important substances contributing to boar taint – androstenone and skatole – are moderately heritable [23]. This means that pigs with low levels of these compounds can be selected to breed for a reduced incidence of boar taint. The process can be enhanced with genomic selection. Once genes associated with the level of these compounds have been confirmed, individuals can be selected based on their DNA fingerprint to increase the rate of progress in breeding out boar taint. Breeds with reduced boar taint are not currently available, but could be a possibility for the future and would be an ideal way to improve efficacy and well-being through the production of entire

males. Candidate genes for genomic selection have been proposed, and breeding for reduced boar taint, including the potential adverse effect on male fertility, are being intensively studied [e.g. 24,25].

Immunological castration

Another option is to raise entire males and use immunological castration (IC). This is an immunization that uses the pigs' own immune system to produce antibodies that neutralize gonadotrophin releasing factor (GnRF) [26]. The vaccine (named Improvest® in the USA) consists of a synthetic analogue of GnRH, combined with diphtheria toxoid (DT), commonly used in vaccines given to children [22]. Injecting this GnRH-DT combination causes the pig to produce antibodies to neutralize it, and these antibodies will then act on the pigs' own GnRH. Ultimately, this temporarily suppresses testicular function, thereby reducing the accumulation of boar taint compounds, and eliminates compounds already present [22]. Additionally, IC has been shown to reduce unwanted sexual and aggressive behavior as IC barrows approach market weight [e.g. 24]. IC is implemented using two subcutaneous injections; the first dose acts to prime the boars' immune system, which should be given no earlier than 9 weeks of age. The second initiates the IC, creating a strong immune response and is given at least 4 weeks after the first, and (as it is reversible) between 3 and 10 weeks before slaughter. This method harnesses all the benefits of raising entire males' right up until the second dose is administered, when IC barrows show a reduction in efficiency for the short period of time before market.

Anesthesia and/or prolonged pain relief

As already mentioned, providing a local or general anesthetic during physical castration has been shown to reduce signs of pain [3,6,8,9,12,15,16]. Additionally, post-procedural pain relief reduced indicators of pain after physical castration [5,7,9,10]. Convincing evidence that pain during and after physical castration can be reduced to an acceptable level, on a commercial scale, and with the drugs available for food producing animals, is lacking. Piglets with short and long-term local anesthetic sprayed directly onto the castration wound did not show a reduction in pain [4]. Additionally, negative impacts of anesthetic techniques are possible when being administered by non-veterinarians. For example, two studies showed inadequate use of anesthetic disrupted nursing behavior [6,13], and the use of carbon dioxide anesthesia, which is aversive or unpleasant to pigs has

been criticized by vets [28]. Although not completely effective in all cases, post-procedural pain relief, using drugs that are available for pigs in some countries (but not currently in the USA), is more promising and easier to administer. One study showed that giving the sow an oral dose of pain relief, provided the piglets with a therapeutic dose through her milk, who then showed reduced pain following castration [7]. Additionally, providing a pain relief drug before the procedure, helped reduce pain after castration [9,10].

Castration is a complex issue affecting the entire pork production chain, from the pig, to the producer, packer, retailer, and consumer. This article introduced the issues involved, the current situation in the United States, and provided information on alternatives to the current method. Part two will describe the current situation with regard to swine castration in other large pork producing regions, discuss the practical, and economic implications of the alternatives, and suggest the potential future direction for US pork producers.

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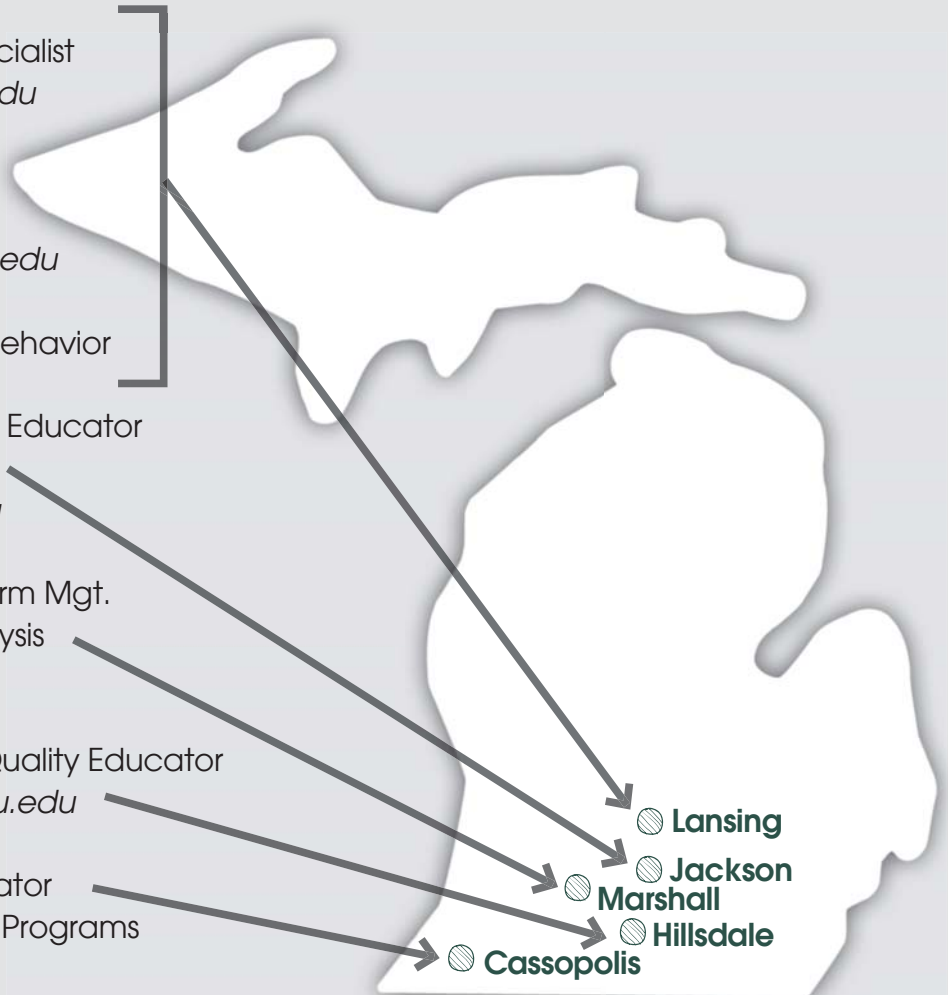
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