



MSU Pork Quarterly



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"Information for an Industry on the Move"

2010

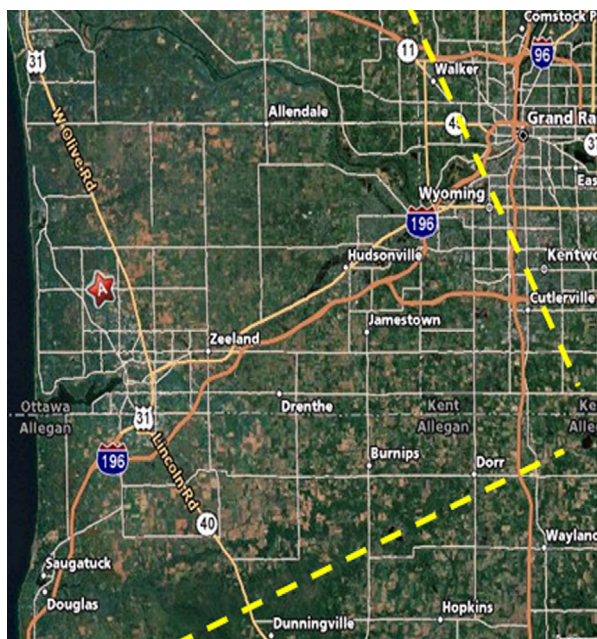
PRRS Regional Elimination Project – Michigan

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Allegan and Ottawa counties are one of the intensive swine raising areas of Michigan. Given the intense production in a relatively small geographical area, similar to other areas of intensive swine production, these farms have had to deal with recurrent Porcine Reproductive and Respiratory (PRRS) infections. Yet this area, because of a unique combination of regional barriers (both natural and man made) and a history of producer cooperation holds promise for the elimination of the disease.



MSU Extension and veterinary practitioners in the area were awarded a grant to undertake a PRRS Regional Elimination Project in this region. This USDA/NPB grant covers initial testing to determine herd status and also provides support for veterinary assistance in developing herd stabilization and elimination plans.

A unique feature of this area is the existence of substantial natural and man-made barriers. To the west (the direction of the prevailing wind) is Lake Michigan. To the south is the Allegan State Forest and to the east is a large urban area (Grand Rapids). These barriers serve to isolate the area from outside infection.

Also the bulk of the pigs that are finished in this area are derived from nearby sow farms, rather than being shipped in from outside sources.

Goals of the project

- Phase 1
 - o Identify all the sites in the area containing pigs
 - o Document the prevalence and severity (reflecting any on-going outbreaks) of PRRS infection in the area

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- Phase 2
 - o Involve producers and generate interest and cooperation among them to address the challenge
 - o Facilitate communications among participants and provide a forum for sharing current program progress.
 - o Compare strains of PRRSV to detail the source of infection for herds – whether from the sow herd supplying pigs or regional spread
- Phase 3 - Assist producers to stabilize and then eradicate PRRS from breeding herds.

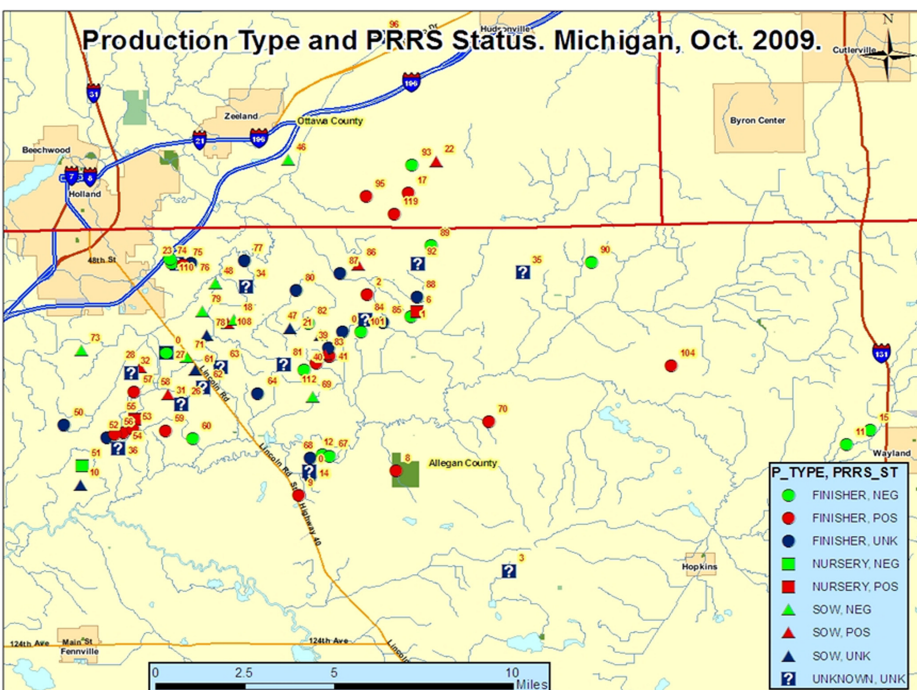
UPDATE Year One - June 2009 to May 2010

Identification of farms in the Allegan-Ottawa area

Participating veterinarians supplied address of clients' farms in the area which was followed up with GPS satellite imaging to identify all farm buildings in the region and then collaborated with a knowledgeable local person to verify the identity of all locations in respect to the kind of animals housed. Swine and poultry facilities were given project ID numbers. A 4' x 8' aerial map of the area has been constructed along with one in a GPS mapping program (below).

Collaboration

The veterinarians serving herds in the area have all joined in carrying out the project. Hamilton Feed Co has graciously provided the project group with a facility for holding meetings. Boeringer Ingelheim has made available two of its veterinarians who have experience with other regional eradication projects in Chile and Mexico, and also provided a GPS mapping system. The USDA Wildlife Service has shared samples from feral hogs collected for the pseudorabies control program.



PRRS Status

Veterinarians provided results of diagnostic testing done either as a survey procedure or part of a control program. Positive farms through history or ELISA testing were followed up with PCR testing to determine strain genotype. Farms and status are shown here.

Additional Surveillance

In conjunction with David Marks of the USDA Wildlife Service, 19 feral pigs that were captured or shot in Michigan were tested for PRRS. Samples were tested for PRRS antibody using an ELISA test. Results are shown below.

ELISA test results from feral swine from 3 counties in Michigan					
0.000	Neg	0.050	Neg	0.000	Neg
0.016	Neg	0.004	Neg	0.000	Neg
0.000	Neg	0.018	Neg	0.000	Neg
0.000	Neg	0.000	Neg	0.000	Neg
0.006	Neg	0.000	Neg	0.000	Neg
0.012	Neg	0.008	Neg	0.000	Neg
0.000	Neg				

While the ELISA test analyzes for antibodies against PRRS virus, not the virus itself, these results indicate that these feral pigs have never been exposed to the virus and therefore currently are not a threat for spread of virus. Three of these samples tested positive for pseudorabies.

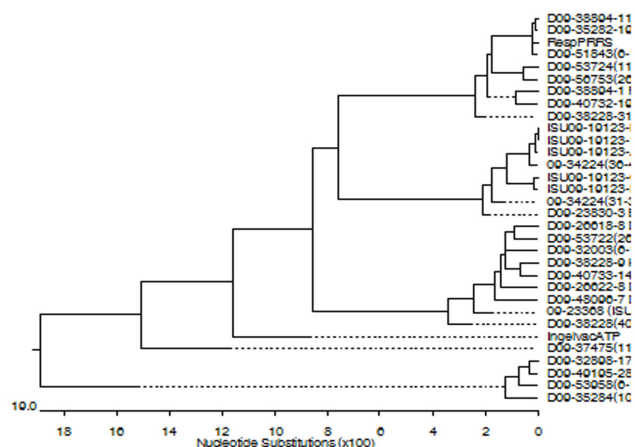
Participant Education

Several producer meetings have been held to promote the concept of regional eradication and report preliminary results. Program concepts regarding the nature of the disease, pertinent animal movement strategies and factors influencing the survival and spread of the virus have been covered. Producer concerns have been incorporated into the program. Producers have specifically requested veterinarians to develop truck sanitary procedure protocols for the region.

PRRS has been determined to cost the US swine industry 5 billion dollars per year, or 1.5 million per day due to decreases in litter size and reduced growth rates. Previous control programs (such as hog cholera, brucellosis, pseudorabies) have relied on regulatory and legal support. The PRRS Eradication Program is voluntary and does not rely on regulatory mandates and penalties. For this to be program to be successful, individuals involved have to appreciate that they are the decision makers and enforce the critical policies necessary to complete eradication themselves. Producers and veterinarians involved in this pilot project do appreciate that they are the decision-makers and enforcers.

Genome Dendrogram

PRRS is caused by an RNA virus that is able to frequently mutate. The mutations can be documented through an analysis which identifies the sequence of RNA material in a specified segment of the virus. On an individual farm, the virus can mutate enough that the earlier immunity is no longer effective and a “new” outbreak occurs. Also whether, on two different farms, if the virus originated from the same source it can be determined by examining the virus genome. Farms in the project area that were positive for virus were sampled to recover virus for genome sequencing.



Questions about the program should be directed to either your regular veterinarian or MSU Swine Extension. For MSU Extension, contact:

Jerry May	Beth Franz
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Future Directions

Experience with managing the project in the first year has identified some strategy/approach/policy that would assist in making the program advance.

- The primary item needed is a close-by/neighborhood regional coordinator. A person who is familiar with, trusted and well-accepted by the community who would be responsible for reminders and updates documenting the cost of infection and strategies for control, as well as promoting continuing efforts at herd as well as regional control.
- A web site
- Strategies for data handling
 - o Premise ID
 - o Automatic release of diagnostic lab reports to the system
- Continued surveillance
- Estimation of aerial infection pressure by monitoring negative pigs moved into the area.

Developing an emergency response plan for your livestock facility

Tom Guthrie, Extension Educator, Pork Team, Jackson

Are you prepared? Even though we may choose not to think about it, disaster can strike on the best managed farms. As we are all aware, we cannot possibly be on-site continuously and emergencies can happen at any time. Being prepared can save valuable time in the instance of a true emergency. The best strategy for minimizing the impact of emergencies very well may be prevention.

When we think about prevention, it can consist of two main elements: planning (training) and awareness (inspection). Therefore, having a plan in place to deal with emergencies may be the best option for everyone involved including your animals. Additionally, one of the topics the Pork Quality Assurance Plus Site Assessment covers is emergency support.

The following is a relatively short list of items that you may consider when developing an emergency response plan for your livestock facility.

Location of the written plan

A written emergency plan should be placed outside of the respective facility in plain view where it can be easily located (fence post, telephone pole, etc). The written plan should be placed in some sort of container that is waterproof (pvc tube, mailbox, etc.). In addition, this waterproof container should be properly marked or identified so that, for example, someone who may not be particularly familiar with the facility can contact the appropriate personnel at any given time in case of an emergency. It does no one any good to have the plan tucked away in the office filing cabinet or located where no one can find it.

General facility information record

Items to consider when developing a general facility information record should include:

1. Owner/operator name
 - a. address, phone number
2. Facility Information
 - a. name of facility
 - b. address, phone number
 - c. directions to the facility from the nearest major intersection
3. Supplemental emergency contact persons
 - a. Second contact person - address, phone number
 - b. Third contact person - address, phone number
4. Veterinarian (optional)
 - a. phone number
5. Emergency response contact phone numbers (Local)
 - a. Ambulance (EMS)
 - b. Fire department
 - c. County Sherriff
6. Emergency response contact phone numbers (State)
 - a. Michigan Department of Agriculture
7. Map of Facility – this map may show the location of hazardous materials, fuel storage, electric panels, etc. etc.

Fire emergency response sheet

1. Farm Fire Protection District and phone number
2. Address of the facility
3. Size and type of operation
4. Fuel stored at the location
 - a. List fuels and quantity
5. Propane gas company
 - a. Name and phone number
6. Hazardous materials
 - a. Location and list

Power outage information sheet

1. Electrical power
 - a. company name and phone
 - b. size of electrical service
2. Generator
 - a. instructions on how to use it
 - b. location
3. Electricians
 - a. names and phone numbers

Discharge or spill emergency response plan

In regard to a manure spill or discharge, the action plan usually involves the recognition and assessment of the problem, containment, notification of authorities and enlistment of help to correct the problem.

In the event of an agricultural pollution emergency, such as a chemical/fertilizer spill, manure spill or breach, etc., the Michigan Department of Agriculture and/or Michigan Department of Environmental Quality should be contacted at the following emergency telephone numbers:

1. Michigan Department of Agriculture: (800) 405-0101
2. Michigan Department of Environmental Quality: (800) 292-4706

Emergency equipment suppliers and contacts

This list may include equipment that is available 24 hours a day and should include primary contacts and phone numbers. Equipment suppliers to consider in this instance may be livestock transporters, a backhoe, bulldozer, vacuum slurry tank, irrigation pumps, or any others that may be applicable.

Pre-arranged emergency response agreements

In order to deal with an emergency efficiently it may be necessary to have prior arrangements made with other individuals. This may include the use of equipment, access to land base, information about business hours, etc.

In conclusion, when developing a written emergency action plan it is important that the plan covers a variety of emergencies that may be encountered. Furthermore, it is also imperative that you write the plan to be site specific for each respective site. Developing these plans may be viewed as time consuming and tedious, but they are essential and necessary. If you encounter an emergency at your farm, will you be prepared?

Sources:

<http://www.michigan.gov/gaamps>.

http://www.michigan.gov/documents/MDA_Manure_GAAMP_129695_7.pdf

Ohio Department of Agriculture Livestock Environmental permitting Emergency Response plan. June 2009.

Let's Talk Animals!^a

Jerry May
MSU Extension Educator
Ithaca, Gratiot County

Last November, 2009, a sub-committee of the MSU Animal Ag and Environment (AAE) team met to discuss sponsoring a conference on animal agriculture in Michigan. The objective for the planning committee was to facilitate a conference that would openly discuss the contentious and controversial issues associated with livestock production in Michigan. Committee members soon recognized planning a conference intended to openly discuss Michigan animal agriculture would need a wide range of expertise and experiences included in the planning process. Therefore Janet Kauffman from the Environmentally Concerned Citizens of South Central Michigan, Elaine Brown from Michigan Food and Farming Systems (MIFFS), and Jan Hartough MSU Extension State Coordinator for Public Deliberation were invited and joined the committee.

Initially the committee struggled to define the issues associated with livestock production that create controversy in communities. Committee members found it difficult to determine which management practices create contention and which practices were generally recognized as less controversial. Once the planners moved from examining practices and instead focused on attributes the conference began to take form.

It is generally accepted there are three attributes all farms, either through thought and planning or without recognition, incorporate in their management scheme for future success; environmentally sound, economically viable and socially responsible. How individual farms emphasize each attribute in comparison to the other two, may or may not, influence the degree of community contention aimed at the farm. The committee decided to identify three speakers, request each speaker identify an attribute they were most attuned to and then that speaker present a scenario where the attribute they selected is emphasized when compared to the other two. The committee selected Dr. Wendy Powers, MSU Director Environmental Stewardship for Animal Agriculture, Dr. Catherine Badgley, University of Michigan Assistant Professor in the Department of Ecology and Evolutionary Biology and Dr. Steve Lovejoy, Professor of Agriculture, Food and Resource Economics at MSU. These speakers were given the freedom to meet and amongst themselves determine who would emphasize each attribute and the order of each presentation.

Dr. Paul Thompson, the W. K. Kellogg Chair in Agricultural, Food and Community Ethics at MSU was asked to lead off the conference by discussing the decision making process and where controversy develops in the community decision process.

On March 8, 2010 "Let's Talk Animals: A Conversation about Animal Agriculture as a Sector of Michigan's Economy" was held at the Kellogg Hotel and Convention Center in East Lansing.

So, how did we do?

Ninety eight attendees participated in the conference, a small audience but well within the expectations of the planning committee. Nearly 100% of the attendees agreed they had gained a better understanding of other positions and felt similar discussions would be valuable in their local community.

Many evaluations contained variations of the following comment: "Addressing this issue needs to take into account a systems approach which includes many outside influences on Animal Ag, including but not limited to: social, environmental, ethical, science, consumer perception, biodiversity, climate change, etc. And to achieve this, many people need to be at the table."

Two individuals representing organizations well known in Michigan agriculture agreed to provide their reflections on the conference.

Ernie Birchmeier, Livestock and Dairy Specialist for Michigan Farm Bureau provided the following comments. “I think that it is important to have honest and open dialogue about animal agriculture and how we meet the demands of our consumers here and abroad. Recent studies indicate, that based upon current trends and demands, we will need to double the world’s meat supply by 2050. Those requirements will dictate the type of livestock production we have here in the United States and around the world. At the same time there are consumers who want different choices, it is important that we meet their requests as well.” Birchmeier continues, “Some consumers are willing to pay more for a specialized product while others make their buying preferences based upon price and habit. Just as in farming operations, neither is right nor wrong, but a personal choice.” And then he adds “It is also important that our educators remember to educate based upon factual information and not upon personal philosophy. It is critical that we educate utilizing sound, accurate scientific information and not personal philosophies.”

“It is generally accepted there are three attributes all farms, either through thought and planning or without recognition, incorporate in their management scheme for future success; environmentally sound, economically viable and socially responsible. How individual farms emphasizes each attribute in comparison to the other two, may or may not, influence the degree of community contention aimed at the farm.”

Rita Jack, Clean Water Program Director for Michigan Sierra Club offered the following comments:

“Interestingly, two of the four presenters took different approaches, but both approached the topic from a global perspective. Dr. Powers believes we should expand our livestock industry to help feed a global need for more meat protein, and Dr. Badgley’s point was that we should all choose to consume less animal protein, that substantial health benefits would be gained, and that smaller “patchwork” farms help protect biodiversity with wind blocks and small woods that provide wildlife corridors.” Jack goes on to say “I’ve never seen a study that included all the management variables, from production of the product to cradle-to-grave management of waste, and it would be very helpful to see that when addressing Michigan’s agricultural economy.”

Finally, Kevin S. Gould, MSU Extension Livestock Educator adds: “Animal agriculture needs to change and improve with technology to meet growing demand for food. Updating environmental and production standards will be the focus of discussions on both sides of controversial issues. I see a future with significant research by Land Grant Universities, like MSU, focusing on science based environmental and production systems. The key will be having animal agriculture and the economic impact valued by our citizens and lawmakers and being sure to value the positive and improve the negative impacts of all types of production systems.”

Many evaluations recognized the value of truthful open discussions like “Let’s Talk Animals” and encouraged the continuation of similar discussions in local communities. But continuing these discussions won’t be easy and will take commitment by interested partners in every town, city, township or county where they may be facilitated. Perhaps the conference may be best summed up by a comment that was repeated in one form or another on several evaluations “The complexities of agriculture/food production afford no simple solutions, this is difficult stuff, there’s no silver bullet.”

“Let’s Talk Animals” was planned and facilitated by the MSU Extension Specialists and Educators including; Dr. Wendy Powers, Beth Stuever, ANR Communications, Jan Hartough, MSU Extension State Coordinator for Public Deliberation and MSU Extension Educators Natalie Rector, Jeannine Schwehofer and Jerry May. The planning committee included Elaine Brown from MIFFS and Janet Kauffman from Environmentally Concerned Citizens of South Central Michigan.

^aOriginally published in the newsletter, THE SCOOP, Jan., 2010, Vol. 4. No. 1.”

Swine Management Program in the Institute of Agricultural Technology accepting Applicants

Certificate programs offered through the Institute of Agricultural Technology (IAT) at Michigan State University provide students with practical training in on-campus courses and off-campus internship experiences. The Swine Management program is two semesters in length and begins during the fall semester. They allow men and women the opportunity to specialize in the area of swine management with a one-year intensified program.

Students enrolled in the swine management program will develop a greater knowledge of swine enterprise management. The program includes a clerkship requirement which provides a thorough “hands-on” experience with members of farm staff to accomplish day-to-day, standard procedures. The swine clerkship at the MSU Swine Teaching and Research Center is designed to develop skills in modern swine production. In addition to clerkship, students are required to complete courses with faculty and staff in the Department of Animal Science and a variety of elective areas.

Learning goes beyond the classroom and the clerkship for the swine management students as they participate in internships. Internships are a form of placement training, compelling students to apply what they have learned in the classroom and through clerkships. They must interact with talented and experienced people in their field, from whom they continue to learn. Internships are an extremely valuable portion of the Ag Tech programs, providing students with the opportunity to broaden their knowledge of the swine industry, along with development of professional skills. In addition, the internship experience earns the students credit toward their certificate.

For admission to the Institute of Agricultural Technology (<http://iat.anr.msu.edu/>), contact the office in 120 Agriculture Hall, East Lansing, MI, 48824, or call (517) 355-0190. Admission is determined by the Institute. You may also contact Ms. Ashley Bushman, Coordinator of the Swine Management Program, at (517) 432-1389 or via e-mail at bushmana@msu.edu.

Additional information can be obtained on the Department of Animal Science website (www.canr.msu.edu/dept/ans/index.html) at Michigan State University.



"Dynamic Careers for a Changing World"

Fetal Programming – Can it impact pork production?

Ronald O. Bates
State Swine Specialist
Michigan State University

Introduction

There is an on-going discussion regarding how the care and treatment of female mammals during pregnancy may impact the subsequent performance of their offspring. In those cases where differences in care among pregnant females do alter subsequent progeny performance, this is called fetal programming. In essence, the care during gestation “programs” the developing fetus in such a way that after birth it grows and develops differently than what may be expected. This interest in possible alterations in animal performance due to gestational management is being studied in pigs as well. It is generally regarded that if pregnant gilts or sows are provided adequate feed, water, space and an appropriate thermal environment (cooling in the summer, warmth in the winter) that gestation environment does not influence subsequent offspring performance. However this may not always be the case. As Michigan producers start to consider how compliance with recent legislation (P.A. 117) may alter how they manage gestating sows, it is relevant to consider how group housing gestating sows may influence the performance of their subsequent offspring.

A recent paper studied the subsequent performance of offspring from gilts housed in different types of housing during gestation^a. This study reported that Yorkshire-Landrace F1 gilts were mated and housed in either 1) Gestation Stalls, 2) Gestation Pens or 3) Stalls for the first 30 days of gestation and then gestation pens. Gestation stalls were 2'x7', while gilts housed in pens were allocated 25.5-30.5 sq. ft. per animal. Gilts were fed 6 lb/day of gestation feed that met or exceeded NRC (1998) requirements. At 110 days of gestation, gilts were placed into standard farrowing stalls and remained there through lactation. Pigs were weaned at approximately 24 days of age. At weaning gilts were placed into nursery pens by weight and these groups of gilts remained intact through the end of the finishing phase. Gilts were placed on self-feeders and fed rations that met or exceeded NRC requirements for each of the nursery and grow-finish phases. At approximately 240 lb, gilts were removed from finishing and were limit fed 5 lb of feed per day and exposed daily to mature boars to detect estrus.

The results from this study can be viewed as two different parts. The first part is how gilts housed differently during gestation performed during lactation, while the second part regards differences in performance of offspring from gilts housed differently during gestation. The farrowing performance of gilts which had gestated in one of these three housing systems could be considered a possible preview to how first litter performance for gilts gestated in groups may differ from a farm's previous experience of gestating gilts in stalls. Gilts that gestated exclusively in stalls were similar in weight at mating and at farrowing (Table 1) compared to gilts in the other two gestation housing treatments. However, during lactation gilts that gestated in stalls exclusively, lost less weight and backfat thickness during their first lactation than females that had gestated in either group housing treatment. Gilts which had gestated in stalls exclusively or in stalls for 30 days and grouped into pens had similar number born alive, compared to each other, but was greater than gilts that had gestated in groups throughout gestation (Table 1.). However after crossfostering across treatment groups, all females regardless of gestation housing treatment had similar number of pigs weaned per litter and similar pig weaning weights.

Gilt offspring, regardless of dam gestation treatment had similar grow-finish average daily gain (Table 2; Avg=2.17 lb/day). However, gilt offspring whose dams gestated in stalls exclusively or had gestated in stalls for 30 days and then grouped into pens had better feed efficiency than gilt offspring whose dams gestated in pens exclusively (Table 2). Gilt offspring whose dams had gestated in stalls exclusively were leaner at 240 lb than gilt offspring whose dams had gestated in either group housing treatment. Furthermore fewer gilt off-

spring whose dams had been housed exclusively in stalls throughout gestation expressed their pubertal estrus by 165 days of age compared to gilt offspring whose dams gestated in either group housing treatment (Table 2). However, though not shown, by 210 days of age there was no difference in the occurrence of puberty of gilt offspring regardless of dam gestation housing type.

This study does demonstrate that the type of gestation housing a female is penned in during gestation may cause fetal programming. That is, subsequent offspring from dams gestated in different types of gestation housing can perform differently. This provides some insight to how pig performance may change after switching gestation penning. Dependent on the type of group housing system chosen for gestating gilts, producers who switch from stalls to group housing may see subsequent offspring be slightly fatter and feed efficiency could worsen. However, if farms maintain an internal gilt multiplication program, gilts from dams gestated in group housing may achieve puberty at a younger age and therefore have experienced more estrous cycles before mated for their first litter, if mated at a constant age.

Conclusion

Gilts housed in different gestation housing types did have gilt offspring perform differently, dependent on the type of gestation housing the gilt was placed into. This suggests that gestation housing system could cause fetal programming. Producers should take note that growing pig performance could differ from previous experience due to a change in gestation housing systems. However, further research is needed to determine how prevalent this effect may be on barrow progeny grow-finish performance as well as determine if replacement gilt farrowing and lactation performance is impacted by the type of gestation housing their dams were penned in.

^aEstienne, M. J. and A.F. Harper. 2010. Type of accommodation during gestation affects growth performance and reproductive characteristics of gilt offspring. J. Anim. Sci. 88:400-407.

Table 1. Lactation Performance of Gilts Housed in Different Gestation Housing Types^a.

Item	Stalls	Pens	Stalls/Pens
Weight at Mating, lb	442.0	429.0	420.0
Weight at Farrowing, lb	543.0	546.0	541.0
Lactation Weight change, lb	-6.6 ^b	-22.9 ^c	-48.7 ^c
Lactation Backfat change, mm	-2.3 ^b	-4.2 ^b	-5.4 ^c
Lactation Average Daily Feed Intake, lb	15.6 ^b	14.6 ^b	12.3 ^b
Number born alive	12.1 ^d	9.1 ^e	11.3 ^d
Number weaned	9.6	9.8	9.6
Avg. pig birth weight, lb	3.5	3.5	3.7
Avg. pig wean weight, lb	19.4	19.4	18.7

^aAdapted from Estienne and Harper, 2010.

^{b,c}Means with differing superscripts differ (P=0.06).

^{d,e}Means with differing superscripts differ (P=0.07).

Table 2. Subsequent Gilt Performance from Dams Gestating in Different Housing Types^a.

Item	Stalls	Pens	Stalls/Pens
Grow-finish ADG, lb/day	2.23	2.14	2.14
Grow-finish Feed/Gran, lb feed/lb gain	2.60 ^b	2.72 ^c	2.61 ^b
Off-test backfat thickness, mm	10.9 ^d	12.5 ^e	12.1 ^{d,e}
Percent reaching puberty @ 165 days of age	13 ^b	48 ^c	40 ^c

^aAdapted from Estienne and Harper, 2010.

^{b,c}Means with differing superscripts differ (P<0.05).

^{d,e}Means with differing superscripts differ (P<0.09).

Share your Ideas for Advancing Michigan

Just like the census comes around every 10 years, we at Michigan State University (MSU) Extension and the Michigan Agricultural Experiment Station need to assess your perceptions about priority programs about every five years! We are committed to using our resources to meet our state's needs. To ensure that our work is focused on addressing the most pressing issues facing Michigan's communities, families, farms and other businesses, natural resource managers, children and youth, we conduct regular statewide needs assessments.

A new assessment will take place this spring and will involve using new tools to determine what Michiganians believe are their most serious issues that can be addressed through the science-based, unbiased research and educational resources offered by MSU Extension and the Michigan Agricultural Experiment Station.

Everyone in the state is invited to the "AdvanceMichigan" project to post their thoughts, pictures, stories and video links on an interactive Web site that can be found at www.advancemichigan.msu.edu. This site will be open from April through the end of June and will be used to gauge residents' interest in topics based on their votes and participation in discussion boards.



Image obtained from the American Society of Animal Science Image Gallery.

Whether they are farmers who take part in experiment station field days for assistance in managing pests or producing larger yields, 4-H leaders who help young people discover the potential they possess, or someone who has never visited or called their county Extension office, all are invited to login to the AdvanceMichigan site and share information, participate in discussions and vote on important issues. The more people who visit and the more frequently people interact there, the richer and more valuable the information that we receive.

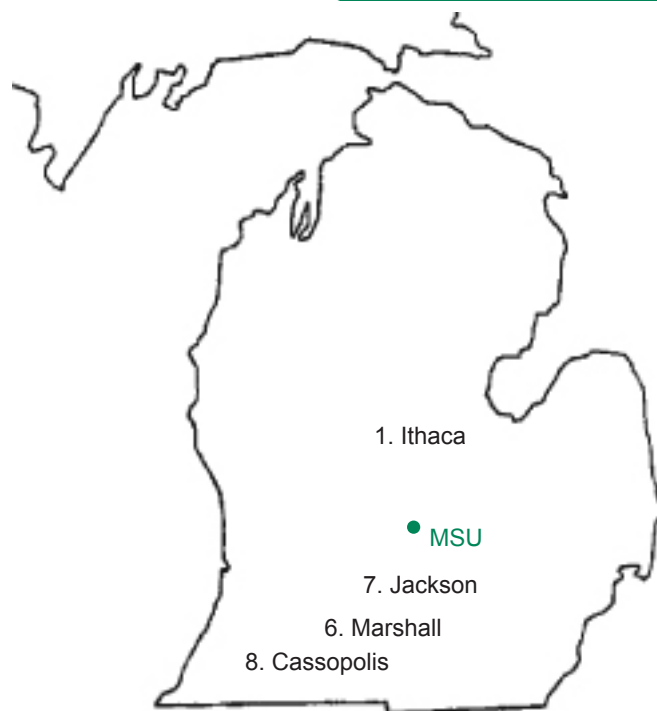
Your participation is encouraged and welcomed and we hope you'll tell a friend to try it as well. The site is completely confidential and open to anyone who cares about the Great Lakes State. You can provide information from any computer with Internet capability--at your home, office, library, or other computer locations. If you have questions, please call your county MSU Extension office at 1-888-678-3464.

Pork Quarterly

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*All comments and
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ANIMAL AGRICULTURE INITIATIVE

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