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"They said it couldn't be done: Reducing Manure Application Rates"

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After working with Dennis Weidman, Huron County Conservation District Groundwater Technician, to complete their farm's comprehensive nutrient management plan (CNMP), brothers Paul and Ralph Swartzendurber were faced with a dilemma: how could they spread hog finishing barn manure at rates low enough to meet the nutrient needs of dry edible beans?

The Swartzendrubers like the advantages of applying manure from their swine finishing operation in mid to late May prior to planting edible beans in early June. Applying manure in May increased their spring manure application window and fields were typically dry enough to minimize soil compaction. Past yields also showed edible beans responded favorably to manure applications.

Their dilemma arose when the farm's CNMP indicated that to meet Generally Acceptable Agriculture Management Practice (GAAMP) standards for nitrogen and phosphorus, on fields being planted to edible beans, they needed to reduce manure application rates. Using liquid hog manure from the farm's finishing barns meant dialing down to about 2,500 gallons per acre.

Edible beans have a lower nitrogen requirement than other crops, such as corn, yet show a yield response to manure applications. Lower rates also allows for applying manure across more acres, thereby reducing phosphorus build-up.

Because of Swartzendruber's desire to minimize the effects of their livestock operation on the surrounding community, mainly odor control, they are avid believers in immediate manure incorporation when soil conditions allow. However the lowest application rate they could achieve was 4,500 gallons per acre, using the equipment they had on hand.

To achieve lower application rates, the brothers knew they could either use surface applications to increase speed and application width, or develop an incorporation system that met

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What's Inside ...

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the desired gallons per acre. That challenge sent the brothers to the farm's shop with their design ingenuity and mechanical ability to develop a manure application system that provided both incorporation and flexible application rates that could be adjusted to meet field and crop fertility needs.

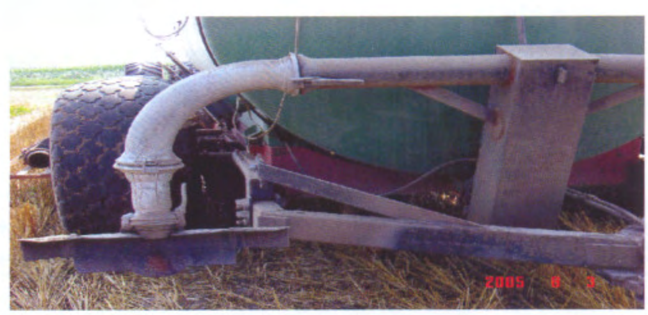
Retrofitting manure spreaders to lower application rates

To incorporate manure at lower rates per acre, without increasing field speed, the brothers knew they had two options. They could decrease the gallons per minute flowing through the factory installed injection system, or, they could maintain the current manure flow by increasing the application width. Swartzendrubers choose the later.

Paul and Ralph started with a 6,000 gallon manure spreader, they removed the injection system that came with the machine when it was purchased. Next they bought a 18-foot field cultivator to pull directly behind the spreader to achieve immediate incorporation. They also wanted the flexibility to pull a chisel plow for crops that could utilize a higher rate of manure, such as corn. They mounted a sturdy draw bar to the back of the spreader in order to pull either implement. The drawbar was constructed out of 4 X 6 X 1/4" square tubing and attached to the frame using the brackets from the discarded injectors.

To provide the spreading pattern for both incorporation tools Paul and Ralph developed an easily interchangeable system. The spreading pattern for the field cultivator was formed by using two six-inch pipes that "T" from a manifold attached to the spreader's discharge valve. Each six-inch line runs 32 inches left and right from the center of the manifold. Attached at the end of each pipe is a standard manure discharge elbow. Yet, instead of angling up, each elbow is set to angle down and discharge the manure approximately 24" from the soil surface. This height provides the opportunity to form an even spray pattern while minimizing manure drift back on to the cultivator itself. The manure spray pattern in front of the field cultivator is formed by splash plates that Swartzendrubers welded together from flat steel. The clamp that attaches the splash plate to the elbow may be loosened and rotated, providing the opportunity to adjust the plate and its spray pattern to fit the overall width of the cultivator. Further adjustment to the spray pattern is made by loosing the clamp that connects the elbow to the six-inch pipe. Rotating the elbow forward or back away from the spreader changes the angle of the splash plate, thus adjusting the overall width of the spray pattern.

For higher application rates, the field cultivator is unhooked from the spreader and



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replaced with the chisel plow. The manifold is removed from the discharge valve and replaced by series of two discharge elbows connected together. By connecting the two elbows, manure is delivered up and over the chisel plow's tongue, where it is discharged out onto a splash plate providing a spreading pattern directly in front of the chisel plow. The drawbar and chisel plow tongue do get covered with manure, but Paul reports outside of that inconvenience, the system is satisfactory.

After two years of use there is no indication of additional wear and stress on the spreader's frame or undercarriage. In fact, when comparing the factory installed injection system with the spreader and field cultivator, the brothers report that the spreader/field cultivator combination pulls easier, causes less compaction, and maneuvers just as easy as it did before the injection system was replaced.

Fine-tuning application rates may be accomplished by adjusting the size of the opening on the rubber cone attached to the end of the discharge elbow. Paul determined the inside of the cone is tapered. So as the discharge end of the cone is trimmed back, the size of the opening increases, allowing for a greater manure flow and higher application rate. By keeping a supply of cones with different discharge openings, Swartzendrubers easily adjust application rates to meet the needs of specific crops and various soil tests on a field by field basis.

The rubber cone on the right has been slightly trimmed to increase flow.

The basket attached to the side of the spreader provides easy access to the hose used to transfer manure from the farm's 6,000 gallon nurse tanks.

Paul points out the rubber cone that may be trimmed to adjust application rates.

Since developing their current application system the brothers have discovered two additional challenges:

First, they would like to find a durable but affordable flow sensor to monitor the manure flow through the spreader's discharge value. If the right sensor can be found they will then incorporate the monitor they use on their crop sprayer into their manure application system. Once calibrated the

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monitor would provide them with a continuous readout and record of manure application rates.

Second, pre-side dress nitrogen testing (PSNT) continues to indicate there is more nitrogen available to growing crops from manure applied using the field cultivator than when manure was applied using the chisel plow for incorporation. Visual appraisal of growing crops and yields tend to show that the PSNT's are right. Paul reasons that the chisel plow may be incorporating too deep or the manure is not incorporated as well and nitrogen is volatizing. The brothers' next goal is to change the spreading pattern on the chisel plow to release manure behind the last set of chisel shank's and prior to a shallow incorporation tool attached to the rear of the plow frame.

What ever the challenges Ralph and Paul have determined that manure utilization based on crop requirements, soil test results and sound environmental practices, results in increased yields with lower costs and ultimately in higher profits.

"Process waste water and swine farms"

Dale W. Roseboom, State Swine Specialist, Michigan State University amd Gerald A. May, Pork AoE Educator, Gratiot, Co., Ithaca

In the modern age of environmental compliance it has been said that "If rain or snow hits "production area waste" then that water is no longer clean and it must be treated as such!" Environmental regulators call this contaminated precipitation "process waste water." Process waste water also includes any well water that comes in contact with "production area wastes" such as water used for power washing or wasted water from a hog drinker.

To fully understand what exactly "process waste water" is, one must first understand the regulatory definitions of "production areas" and "production area wastes."

Michigan Department of Environmental Quality (MI DEQ) defines a "production area" as any area of a farm used for livestock production activities including animal housing, manure treatment and storage, feed storage, and mortality management. Production areas do not include land used for application of waste or areas covered with a desired forage crop and used as pasture[1]. Production areas on swine farms may include open lots, housed lots, feedlots, barnyards, animal walkways between buildings, drains not directed to containment storage units, manure piles, manure compost piles, mortality compost piles, mortality and afterbirth containers, bedding materials, and pasture land not covered with a desired forage crop.

"Production area wastes" are raw materials or solids such as manure, wasted feed, mortality, afterbirth, and manure or mortality compost which accumulate or collect in production areas. With this understanding, we once again come to the definition of "process waste water" as any clean water that has come into contact with production area wastes.

Process waste water is sometimes called effluent, brown water, or dirty water. Michigan Department of Agriculture (MDA) Generally Accepted Agriculture Management Practices (GAAMP's) refers to process waste water as runoff. Because process waste water may have an unacceptable biological oxygen demand and contains nutrients and bacteria it may not be discharged to ground waters or surface waters of the state.

1 MI DEQ defines a pasture as areas "characterized with a predominance of vegatation."

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Technically as defined by MI DEQ, process waste water does not include precipitation on cropland or pasture. However, precipitation runoff (rain, snow melt), either through surface runoff or tile drains, that contains nutrients from manure or waste water applications constitutes an illegal discharge.

Michigan DEQ regulations require that all large[2] Concentrated Animal Feeding Operations (CAFO's) contain all production area wastes and process waste water until the wastes can be appropriately field applied at agronomic rates. Currently MI DEQ has under review a new National Pollution Discharge Elimination System (NPDES) permit intended to be applicable for all large CAFO's. Under this new permit large CAFO's must have 6 months of storage capacity designed, constructed, maintained, and operated to contain all production area wastes and process waste water generated from the operation. For swine, this storage capacity must also be able to contain the process waste water from a 100-year 24-hour storm event.

All other swine farms must comply with MDA GAAMP's concerning management of process waste water or runoff, in order to have "Right to Farm" protection. According to the GAAMP's, this waste water may not leave the owner's property or adversely impact surface or groundwater quality. It is further stated in the GAAMP's that provisions should be made to control and/or treat process waste water or runoff to protect groundwater and surface waters. Storage of process waste water is not a required practice.

Consequently, process waste water is a concern for hog operations of all sizes. It is in the best interest of every producer to minimize the amount of clean water coming in contact with livestock production areas. Prevent rain and melted snow from coming in contact with production wastes by using gutters and downspouts and by diverting clean water around production areas. Keep outside feed storage and processing areas clean by collecting spilled feed. If practical, consider covering lots and compost areas to prevent rain and snow from contacting the production area. Finally, open lots may be made into pastures which have a lesser environmental concern, if stocking densities are reduced and permanent vegetation is established.

Understanding the increasingly complex requirements for environmental compliance is challenging. All pork producers should be aware of the MI DEQ requirements and(or) MDA accepted practices for process waste water generation and management on their farm.

2 10,000 swine weighing less that 55# or 2,500 swine weighing 55# or greater.

"Water Management in Swine Facilities"

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Introduction

Why is water so important? Water is the nutrient that is required in the largest quantity by swine and is the most essential nutrient for life. In turn, water fulfills many physiological functions ranging from giving form to the body, playing a crucial role in temperature regulation, movement of nutrients to cells of body tissues and lubrication of the joints. Water may very well be the most frequently misunderstood and mismanaged nutrient when compared to other nutrients supplied by feed. Therefore, when making decisions involving swine production facilities, there are several

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factors such as source of water, estimated water requirements, flow rate recommendations, number of drinkers, water supply and water quality that should be considered.

Source of Water

Pigs obtain water to meet physiological needs such as growth, reproduction, and lactation from three main sources. These sources include water from feedstuffs, water from metabolic processes and drinking water. Feed ingredients that are most commonly used in swine diets typically contain about 10 to 12% water (NRC 1998). Metabolic water originates from the breakdown of carbohydrates, fat and protein. However, drinking water is by far the major and most important source of water for swine.

Water Requirements

How much water do pigs need? Pigs must consume enough water to balance the amount of water lost. Care must be taken when determining water requirements for pigs, because true water usage is generally overestimated. Water wastage is generally not taken into account, therefore there is a difference between water consumption and water disappearance (animal intake plus water waste).

Current research information provides only estimated water requirements because there are many different factors that can influence the amount of water required by pigs on a daily basis. The factors that may influence water requirements of swine include: feed intake, ingredients in the diet, temperature, state of health and stress level. Water needs may vary as much as 50% due to some of these factors. In turn, only estimates of water requirements are reported for pigs under optimum environmental and management conditions (Table 1).

Table 1. Estimated water requirements of swine.

Class of Pig	Gallons/pig/day
Nursery (up to 60 lbs. BW)	0.7 - 1
Grower (60 – 100 lbs. BW)	2 - 3
Finisher (100 – 250 lbs. BW	3 - 5
Nonpregnant gilts	3
Gestating Sows	3 - 6
Lactating Sows	3 - 7
Boars	5

Source: National Pork Board, Swine Care Handbook (2003 Edition)

Number of Drinkers

According to responses provided by Michigan pork producers for the Michigan Finishing Management Farm Exercise Summary, 59.7% of participants indicated that they were using nipples as a drinker type. When considering nipple drinker mounting, 40.4% indicated that nipples were mounted and 29.8% were utilizing swing drinkers. Table 2 lists the suggested height and recommended number of pigs per drinker when using gate-mounted nipple drinkers.

Table 2. Gate-mounted nipple drinker stocking and height recommendations.

Item	<12 lb.	12–30 lb.	30–75 lb.	75–100 lb.	100–240lb.	Breeding Herd
Pigs/nipple	litter	10	10	12-15	12-15	12-15
Height, inches	4 – 6"	6 – 12"	12 – 18"	18 – 24"	24 – 30"	30 – 36"

Source: Midwest Plan Service, Publication # MWPS-8

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It must be noted that these recommended heights are appropriate for nipple drinkers that are mounted at a 90° angle. If mounting brackets with 45° angles are used, greater heights are necessary in order for the pig to manipulate the drinker and minimize water wastage. If swinging drinkers are utilized, the adjustment of 3 inches above the pig's topline is recommended as the pigs grow.

Water Supply Issues

As grow-finish swine facilities have gotten larger over time, it is critical that water supply lines are sized correctly. Consider an example proposed by Brumm during the 2005 NPB Pork Academy, assume a water delivery system for a 1,000 head finishing facility which has 20 pens on each side of the center aisle. Each pen has two nipple drinkers. Now consider all the nipples on one side of the aisle are in use at the same time. Assume 4 cups/min flow from each nipple (Table 3). The total water flow from the supply line would have to be 10 gal/min.

Calculation:

A. 40 drinkers x 4 cups/min = 160 cups/min

B. There are 16 cups = 1 gallon

C. (160 cups/min) /(16 cups/gal) = 10 gal/min

Therefore, if the supply line is incapable of delivery at least 10 gal/min. there is a chance that one or more drinkers would have reduced flow or even no flow when pigs are attempting to drink.

Table 3. Recommended flow rates of drinking devices.

Class	8 oz. cups/min.	sec./1 cup
Piglet	1	60
Nursery (up to 50 lbs.)	2	30
Grower (50 – 125 lbs.)	3	20
Finisher (125 – mkt.)	4	15
Sow	6	10

Water Medication Issues

Issues associated with water medicator attachments to water supply lines may frequently be overlooked. For example: many commercially available water medicators are equipped with a 5/8" hose bib for attachment to water supply lines. If a facility has a supply line that is 3/4" or larger, the size and flow of water is being reduced at the point of the medicator attachment. For example, consider purchasing a 1/2" washing machine supply hose to attach medicators. By doing this, the 3/4" supply line has been reduced by a ¼ of an inch, in turn further restricting water flow.

Water and Manure Issues

Research indicates no difference in pig performance between grow-finish pigs when water was provided in a wet/dry feeder versus a gate-mounted nipple drinker (Brumm et al., 2000). However, a 30% manure production reduction was noted for the wet/dry feeder in a summer trial and a 14% decrease in manure volume was reported when comparing swinging drinkers to gate mounted nipple drinkers in a winter trial (Brumm et al., 2000). When selecting a drinking device, type of production system may be a factor.

Production systems that store manure in deep pits under fully slatted floors may select drinking devices that may limit the amount of water wastage in order to increase the amount of available manure storage capacity. Although manure volume varies with water wastage, the

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amount of total nutrients (N, P, and K) in the manure does not. Therefore, the total amount of land needed for responsible land application of collected nutrients does not vary, only the amount of manure applied per acre. One thing to consider in this situation is that the dry matter concentration may be 5 to 6% higher when water wastage is minimized. In turn, this may mean different equipment may be needed to agitate, load and apply liquid manure. In contrast, in some production systems water savings associated with drinkers may be of less concern. For example, in a production system where manure is stored in a lagoon, water wastage from drinking devices potentially makes manure flow easier from the pipes to the lagoon. The addition of waste water may also reduce the risk of odors from the manure storage device contributing to a more dilute effluent. However, an increase in manure volume translates into more time required for hauling and applying manure.

Water Quality

Elements and other substances can occur in water levels that may be harmful to pigs (NRC 1974). Water may contain a variety of microorganisms, including bacteria and viruses. Most commonly encountered microorganisms are *Salmonella*, *Leptospira* and *Escherichia coli*. In 1973, the Bureau of National Affairs proposed that water used for livestock should not contain more than 5000 coliforms/100mL (NRC, 1998). This recommendation can be used only as a general guide because some pathogens may be harmful below this level.

Another aspect of water quality that may be considered is Total Dissolved Solids (TDS). TDS is a measure of the total inorganic matter dissolved in a sample of water. Calcium, magnesium, and the sodium in the bicarbonate, chloride, or sulfate form are the most common salts found in water with a high TDS (Thulin and Brumm, 1991). Table 4 indicates the recommended ranges in ppm of TDS for pig consumption.

Table 4. Water Quality for Pigs Based on Total Dissolved Solids (TDS ppm)

TDS (ppm)	Rating	Comment
<1000	Safe	No risk to pigs
1,000 to 2,999	Satisfactory	Mild diarrhea in pigs not adapted
3,000 to 4,999	Satisfactory	May cause temporary refusal
5,000 to 6,999	Reasonable	May be used with reasonable safety for growing-finishing pigs
>7,000	Unfit	Considerable risk to pigs subjected to heat stress and disease conditions

Source: Adapted from NRC (1974)

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In situations where poor water quality may exist, it is essential to first determine the impact on animal performance. For example, sulfates are not tolerated well in the gut of the pig which may result in diarrhea and reduced performance. Nitrites impair the oxygen-carrying capacity of the blood. Nitrates and nitrites in water also may impair the use of Vitamin A by the pig (Wood et al., 1967). Please refer to Table 5 for the recommended maximum ppm of these major ions.

Table 5. Water Quality Guidelines for Swine

Item	Recommended Max. ppm
Major ions	
Calcium	1,000
Nitrate-N	100
Nitrite-N	10
Sulfate	1,000

Source: Task Force for Water Quality Guidelines (1987)

If it is determined that poor water quality is impairing animal performance, there are a few options that are available. One option is chlorination, which destroys disease-causing organisms. However, the effectiveness of disinfection and the quantity of chlorine required may depend on the quantity of nitrates, hydrogen sulfide, ammonia, and organic matter in the water (Thacker 2001). When using water containing a high TDS load, a reduction in the salt (NaCl) level in the diet may be warranted. Although, caution must be used to ensure an adequate amount of chloride level is maintained. The reason for this caution is that high concentrations of chloride are not usually found in water of poor quality (Thacker 2001).

Take Home Message

Water should be viewed as the central nutrient and is one of the most important and essential nutrients required by pigs. A reduced or restricted water intake will slow the growth of pigs. If not enough water is available for consumption this could also have an affect on muscle mass and muscle definition. Therefore, it is important to consider the needs of pigs throughout the various stages of production and growth within your respective operation, and to also consider evaluating all factors that relate to water in swine facilities. In addition, implementing a basic maintenance program, including checking filters and flow rates prior to the introduction of new animals in the barn and through daily observations, would be beneficial to ensure pigs are receiving an adequate water supply.

References

Brumm, M.C. Water Systems for Swine

Brumm, M.C., J. M. Dahlquist, and J. M. Heemstra. 2000. Impact of feeders and drinker devices on pig performance, water use, and manure volume. Swine Health Prod. 8:51-57.

MWPS. Midwest Plan Service. 1983. Swine Housing and Equipment Handbook. Publication no. MWPS-8. Ames: Iowa State University

National Pork Board, Swine Care Handbook. 2003 Edition. Page 33.

NRC. 1998. Nutrient requirements of swine. Tenth revised addition. 90-96.

Thacker, P.A. 2001. Water in Swine Nutrition. In: Lewis A.J., Southern L.L. editors. Swine Nutrition. Boca Raton: CRC Press. Pages 381-398.

Wood, R.D., C. H. Chaney, D. G. Waddill, and G. W. Garrison. 1967. Effect of adding nitrate or nitrite to drinking water on the utilization of carotene by growing swine. J. Anim. Sci., 26:510.

"Sow Retention and Ways it May be Improved"

Ronald O. Bates, State Swine Specialist, Michigan State University

Over the last 5 years there has been an increasing effort to better understand what impacts sow longevity and what can be done to improve it. The greatest challenge in evaluating factors that impact longevity is finding adequate descriptions that accurately list why sows leave the breeding herd. This was born out in a recent publication[a] in which the authors had access to data from 22 sow herds. These farms all had data recording systems that had a multitude of descriptions available to farm personnel to characterize the reasons a sow was removed from the herd. The preliminary summary of reasons for sow removal across these 22 farms determined that 22.3% of sows were removed for unknown causes. This is a critical finding from this study. It becomes difficult to improve something that is inaccurately described. Farm level record keeping on animal removal and culling is just as important as recording the animal productivity data that is routinely kept.

Within this study the authors determined a subset of farms in which the data recording was dramatically better and were able to summarize the lifetime records from approximately 13,754 females. Reproductive reasons for removal accounted for 48.5% of all removal reasons. Among reproductive reasons "not in heat" accounted for 20% of removal reasons while "return to service", "failure to conceive" and "abortion" accounted for 12.5%, 8.1% and 7.2%, respectively. Disease manifestations accounted for 17.8% of removals while old age and death accounted for 6.7% and 3.6%, respectively.

For this study all removal reasons were classified into one of three categories. These categories were; 1) Reproductive Removal (RR), 2) Non-reproductive Removal (NRR), including health and disease manifestations and 3) Other Removal Causes (OR).

The heritability of these three removal categories were estimated along with the genetic correlations. The heritability for RR was 0.18, while the heritability for NRR and OR was 0.13 and 0.15, respectively. The genetic correlations among these traits were 0.89 between RR and NRR, 0.91 between RR and OR and 0.99 between NRR and OR. This is very encouraging. This suggests that selecting to reduce any of these causes of removal should yield reasonable results over time. In addition the relationship amongst these traits is very high and favorable, thus causing change in one will elicit a near one to one change in the others.

Since these traits all have similar heritability estimates and are highly related to each other, the authors suggest that selecting for increased parity at removal, which effectively is selecting for a reduction in all three removal categories simultaneously, may be an appropriate compromise.

However, this causes a difficult dilemma in swine genetic improvement programs. Since pigs can farrow multiple times per year and are litter

[a]Arango, J., I. Misztal, S. Tsurata, M. Culbertson and W. Herring. 2005. Study of codes of disposal at different parities of Large White sows using linear censored model. J. Anim. Sci. 83:2052-2057.

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bearing, the ratio of offspring to parents is dramatically different than in species that have a longer gestation length or only have offspring once per year. For example let's assume that a 400 cow herd has a 90% calving rate and females have their first calf at 2 years of age. The 400 cows will produce 360 calves of which 180 will be heifers. If all heifers are kept as replacements the ratio of offspring to replace parents is 45% to 1. In other words, for every cow there is 0.45 heifers to replace her each year. If only the top 50% of heifers are kept as replacements and they all calve, the ratio becomes 22.5% or 0.225 heifers to replace one cow each year.

Pigs are different. For example, a 400 sow herd farrows two litters per year. Each litter has 8 offspring survive until market weight and 50% of the litter is females. If all of the females are kept this gives a ratio of offspring to parents of 800% to 1. In other words 8 females are available to replace one sow. If one-half of potential females are kept as replacements the ratio is still 400% to 1.

The swine breeding industry has used this large offspring pool to reduce generation interval. Since there are so many offspring to choose from each year, the opportunity to replace a parent with a superior offspring is very easy. This speeds genetic improvement on an annual basis and has allowed the seedstock swine industry to move quickly to respond to the needs of the commercial pork industry as well as consumer demand, when selection has been for traits that occur early in life.

However, if traits such as parity at removal become a part of the selection objective then it becomes more difficult to pick which offspring may be superior to its parent. This is due to waiting for the trait of interest to be expressed, in this case parity at removal. In an effort to get enough animals to express this trait accurately, culling policies may have to change to keep females in the sow herd until they cull themselves. For example within the 400 sow example above, assume that culling could not occur, unless the female dies or wouldn't breed until after 3 parities. In this case a sow would have 12 female offspring born before a decision is made to select a replacement. However, only the last 4-8 females produced from the sow would be available to replace her. This will increase the time it takes to replace parents which will correspond to increasing the generation interval and reduce the selection intensity, which is the proportion of selected offspring compared to the number available for selection. These tradeoffs may be necessary to improve sow longevity but it will hamper improvement of other traits such as litter size, litter weight, growth rate, etc.

Much more research is needed to better determine how to select for improved sow longevity as well as optimize selection for other economically important traits. If the generation interval is increased so to more accurately assess sow longevity, commercial pork producers may notice reduced genetic progress for other traits such as growth rate, litter weight and size.

Research into traits that are expressed earlier in life and relate favorably to sow longevity may alleviate the need for increasing the generation interval. Furthermore, DNA markers that relate to favorable sow longevity may be able to be utilized as well. In addition, commercial sow records may feed back into the genetic evaluations of the pureline or purebred nucleus animals. If commercial females are from single sire matings, matings in which only one boar is used, records from commercial sow farms would add to the accuracy of genetic evaluations in the nucleus farms. Consequently nucleus herds may not need to extend their generation interval by including records from commercial sow farms, since commercial farms sows try and maintain females for their complete productive life.

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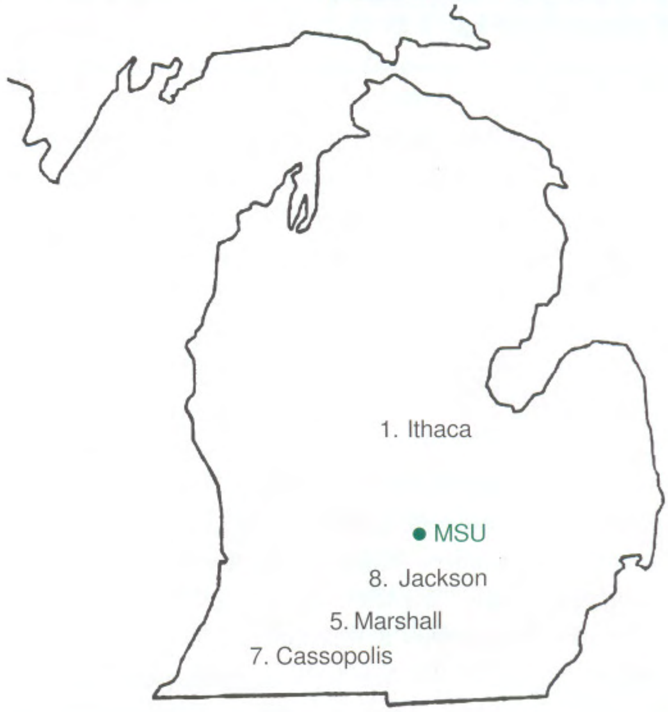

NATIONAL PORK BOARD'S PROFESSIONAL SWINE MANAGER'S CONFERENCE

NOVEMBER 14-15, 2005
LANSING, MI

TOPICS WILL INCLUDE:

Gilt Pool Management
Troubleshooting Litter Size
Ventilation Management
Sanitation
Employee Management
Stray Voltage
Posting Pigs on the Farm
Preparing for a Welfare Evaluation
Feed Grain Outlook
Emerging Swine Diseases
Sow Longevity

This program will be held at the Holiday Inn South in Lansing. For more information and registration materials please contact the following sources:

National Pork Board: Ph: 800-456-PORK or www.porkboard.org

Michigan Pork Producers Association. Ph: 517-699-2145 or kelpinski@mipork.org

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