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Distiller's Dried Grains with Solubles, Housing, and Breeding Herd Performance

A review of an April 2014 Journal of Animal Science article by X. Li and others entitled: Interactive effects of distillers dried grains with solubles and housing system on reproductive performance and longevity of sows over three reproductive cycles.

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Introduction

The major goal for the breeding herd is to provide excellent nutrition and housing in order to maximize productivity and longevity. Distillers dried grains with solubles (DDGS) have been commonly fed to growing swine for decades, but have been used cautiously in sow diets. There is limited research documentation in regard to the use of DDGS in sow diets. The housing of gestating sows is an important issue for pork producers in Michigan and throughout the United States. Previous research has shown that housing sows in groups during gestation may or may not have negative effects on reproductive performance. Inconsistency among studies indicates that there are numerous aspects of housing systems that can and do influence breeding herd performance. A recent research report from the University of Minnesota (Li et al., 2014) has described interesting information about the interactive effects of feeding DDGS-containing diets and housing system on sow performance and longevity over three reproductive cycles. In this review, we've listed our highlights of that study.

Methods

The study began at breeding, when a total of 401 females (311 gilts and 90 P1 sows) were assigned randomly within parity to one of four treatments. Sows were then kept on the same treatments for up to three reproductive cycles. Experimental treatments were:

1) Sows fed a corn – soybean meal based diet

In This Issue...

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throughout gestation and lactation and housed in pens throughout gestation.

2) Sows fed a corn – soybean meal based diet throughout gestation and lactation and housed in individual stalls throughout gestation.
3) Sows fed a similar corn – soybean meal based diet with the inclusion of 40% DDGS in the gestation diet and a 20% DDGS inclusion rate in the lactation diet and housed in pens throughout gestation.
4) Sows fed a similar corn – soybean meal based diet with the inclusion of 40% DDGS in the gestation diet and a 20% DDGS inclusion rate in the lactation diet and housed in individual stalls throughout gestation.

Sows remained in their gestation housing system until 109 days of gestation. Electronic sow feeders were used for sows housed in pens (about 50 sows per pen; space allowance of about 24 sq. ft. per sow) and managed in dynamic groups. Sows housed in pens were exposed to two mixing events during gestation: at introduction to the pen and then again eight weeks later when new sows were introduced. Individual stalls were equipped with a feeder and nipple drinker and sows were fed once a day. For all females, the amount of feed received in gestation was adjusted to achieve a body condition score of '3' at the time of farrowing.

In lactation, all sows were housed in individual farrowing stalls, stair-stepped increasing amounts of feed for five days post-farrowing, and allowed ad libitum access to their assigned lactation diets thereafter; until weaning which occurred at about day 19 of lactation. Within 24 hours of birth, piglets in litters from the same dietary and housing treatment groups were cross-fostered to equalize litter sizes as much as possible.

Concentrations of vomitoxin and zearalenone in the two DDGS diets used in this experiment were <0.66 mg/kg and < 0.2 mg/kg, respectively, in the first lot and < 0.5 mg/kg and < 0.2 mg/kg, respectively, in the second lot. The authors described these concentrations as "generally recognized as safe for swine diets."

Longevity was studied over three reproductive cycles and sows were removed from the study for the following reasons: if they failed to conceive after the second postweaning service, were anestrous longer than 21 days postweaning, experienced lameness (attempted to relieve limbs or reluctant to put weight on limbs), or death.

Sow genotype was described as English Belle (GAP Genetics, Winnipeg, Manitoba) and all litters were produced by artificial insemination using Duroc boar semen.

Highlights

Litter Size. Sows fed DDGS diets had smaller litter size born alive (11.0 vs. 11.6) and at weaning (9.8 vs. 10.2) than sows fed the corn–soybean meal diets. Feeding of DDGS resulted in more stillbirths (0.9 vs. 0.7). The researchers from Minnesota admit that a definitive explanation for the increase in stillborn pigs as a result of feeding diets containing DDGS is not clear. But they speculate that DDGS may contain peroxidized oil which creates an oxidative stress for sows in late gestation that leads to an inefficiency of nutrient and oxygen transfer through the placenta causing death of fetuses before birth. Over three reproductive cycles, sows fed DDGS produced fewer live-born pigs (26.2 vs. 27.4) and tended to have fewer pigs weaned (23.7 vs. 24.5) compared with sows fed corn–soybean meal diets. Preweaning mortality did not differ between dietary treatments.

Group-housed sows tended to farrow smaller litters born alive (11.0 vs. 11.5), and statistically had significantly fewer pigs at weaning (9.9 vs. 10.2) compared with stall-housed sows. The researchers describe the 0.5 fewer piglets born alive to group-housed sows, a "major finding" of their study. In the discussion of this result, they state that there is inconsistency among studies regarding the impact of sow gestating housing on number born alive. They cite two studies that agree with their findings and three studies that showed no impact of group housing on this important measure. They conclude that "numerous aspects of housing systems can and do influence prolificacy of sows." Stillbirths per litter were unaffected by housing treatment. Over three parities, stall-housed sows farrowed more total pigs (30.1 vs. 26.7) and live pigs (28.4 vs. 25.2), and

weaned more pigs (25.2 vs. 23.1) compared with group-housed sows. Preweaning mortality did not differ between housing treatments.

Without a clear explanation of reasons why such would happen, the Minnesota research group noted that the reduction in litter size in group gestation housing compared with stall housing was greater when sows consumed corn-soybean meal diets. Sows fed DDGS produced a similar number of pigs in stall and group pen housing. Possibly, since the litter size born alive of the DDGS sows is already 0.6 pigs less, the likelihood of the housing system having an additional measurable reduction is more improbable.

Longevity. Overall, diet did not affect the percentage of sows that were able to complete three reproductive cycles. A greater number of sows fed DDGS diets, as compared to sows fed the corn-soybean meal diets, were culled because they were anestrous longer than 21 days postweaning (52 vs. 41). In contrast, a greater number of corn-soybean meal fed sows, as compared to sows fed DDGS diets, were culled because they failed to conceive after the second postweaning service (21 vs. 16).

Housing gestating sows in pens in this study resulted in fewer sows completing three reproductive cycles than housing in stalls (68.9 vs. 55.8%). Compared with individual stalls, group housing resulted in more sows (51 vs. 42) that were anestrous longer than 21 days postweaning, more sows that failed to conceive (24 vs.13) after the second postweaning service, and a greater incidence of culling due to lameness (11 vs. 5). The Minnesota research group mentions four other research studies in which group gestation housing has negatively affected sow longevity, mostly due to an increase in lameness. They did not cite any other studies which have documented reproductive failure in group-housed sows.

Further Notations

Litter Growth. The authors reported and discussed differences in litter weight gain due both to diet and housing system. Differences were likely due to the differences in litter size. When number of pigs weaned was used to 'adjust' litter weight gain, neither sow diet nor sow gestation housing affected piglet growth rate during lactation. The adjustment is correct, as lactating sows respond to the 'demand' for milk and this demand reflects the size of the nursing litter.

Lactation Feed Intake. Average daily feed intake (ADFI) of sows during lactation was not different between sows fed DDGS and corn-soybean meal diets during any reproductive cycle. Lactation feed intake was different between housing systems across reproductive cycles. Sows housed in stalls consumed 0.66 lb. less feed each day in the first reproduction cycle. Housing system did not affect ADFI during lactation in the second reproductive cycle, but in the third reproductive cycle stall-housed sows consumed 0.66 lb. more feed each day compared with group-housed sows.

Sow Body Condition. No differences in sow gestation weight or backfat change were observed. However, feed intakes in gestation were not reported, making it difficult for us to separate-out potential effects of dietary or housing treatments on sow weight and backfat changes.

Take Home Messages

This study suggests that long-term feeding of DDGS decreases litter size but does not affect sow longevity. It suggests that long-term housing of sows in pens decreases litter size and sow longevity. Peculiarly, this study suggests that sow diets and housing well-being may interact to affect lifetime productivity. Diets and housing are important, but research reports like this one, frequently do not clearly describe in detail other important aspects of husbandry or stockmanship. Sow well-being, productivity, and longevity, are assuredly also outcomes of management and the implementation of critical animal care practices.

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Transportation Management When Hauling Market Hogs - A Transporter's Perspective

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It is well noted that the vast majority of market hogs in Michigan are transported to market channels out of state because there are no major packing facilities within the state of Michigan. Therefore, the transportation of hogs to market channels has become a key segment of the Michigan pork industry. The objective of this article is to give an insight to a transporter's perspective in regard to the transportation management of market hogs. I recently had the chance to visit with a respective livestock transporter and asked him about his thoughts.

Tom: How long have you been in the livestock hauling business?
Transporter: 33 years, I started in 1981.
Tom: What made you decide this for a career?
Transporter: Four generations of livestock hauling, kind of a family tradition, I guess.
Tom: Can you give me a few examples of how things within the industry have changed over the years?
Transporter: Department of Transportation rules and regulations is the biggest thing. Some for the good, others I'm not for sure. In some cases these can be difficult to manage when transporting livestock.
Tom: What do you like most about hauling hogs?
Transporter: Working with animals but also visiting with other farmers about their operations because my family farms as well, about 800 acres of row crops. So it is interesting to hear about some of their experiences and how their crops are doing at different times of the year.
Tom: What do you like least about it?
Transporter: The long hours.
Tom: Are there challenges out on the road when hauling hogs?
Transporter: Oh yeah, traffic jams, getting from point A to Point B in a timely fashion and weather. Winter time can be challenging with icy roads.
Tom: What about challenges in regard to handling hogs. Anything come to mind?
Transporter: *Laughing…*Handling tool rules. Some loads can be a real challenge, others go great. I guess it depends on a lot of factors: good handling practices, weather, facilities, load out shoots, etc.
Tom: Over the years, there have been Pork Industry Quality Assurance Programs developed, more specifically the Transport Quality Assurance Program. What is your perception of this program?
Transporter: I think it is good. You can always learn a few things from the program and pick up a thing or two every time that you go through it for recertification.
Tom: Has the TQA program helped you in anyway?
Transporter: Yes, moving smaller groups of pigs when they aren't handling good and being more aware of things that can distract hogs when handling them like sunlight, shadows and wind.
Tom: Are there any other types of programs that would be useful to transporters?
Transporter: I can't think of any.
Tom: When considering the linkage between the pork producer, you the trucker and the packing facility, what is the most important aspect for you as a trucker?
Transporter: Definitely communication. A lot can take place when trying to get hogs loaded at the farm and delivered to the plant on time. Certain times of the year are extra challenging, like in the spring when farmers are trying to get their crops planted and in the fall when they are trying to get crops out of the field.
Tom: From your perspective, how do you think pork producers view truckers?

Transporter: A good working relationship is important.
Tom: Do you feel that as a transporter you have investment within the pork industry as well?
Transporter: Yep, pretty much. I have a lot invested in my equipment (truck and trailer) and put in long hours. If I don't do a good job delivering hogs, that comes back on me and I want to stay in the business.
Tom: Over the past few years the pork industry has been faced with some swine health related issues. What does biosecurity mean to you?
Transporter: Keep things as clean as you possibly can.
Tom: What are some biosecurity measures that you practice?
Transporter: Clothes washed, boots clean. I keep my clean clothes separate from dirty ones in compartments of my truck. I also wash my trailer after every load. I understand the importance of a clean trailer but that does get to be expensive for me when I look at the cost and how much time I spend at the wash barn and how that affects my load schedule throughout the week.
Tom: If there was one thing that you could change about hauling hogs what would it be?
Transporter: Amount of time spent in line at the plant waiting to unload hogs.
Tom: Where do you think the Livestock Transportation Industry will be, say 5 to 10 years from now, any thoughts?
Transporter: Oh gosh, that is a tough one. I'm concerned about the amount of rules and regulations that may impact how we are able to efficiently function as a business.
Tom: Thanks for your time today.

Take home message

There appear to be a few key points that seem to surface after visiting with this livestock transporter.

1) Time is valuable and communication is an integral part for maximizing time efficiency for all parties. For example: If the trucker is running late for whatever reason (traffic, bad weather, delay at the plant, a waiting line at the truck wash, mechanical issues, etc.) then that information should be relayed to farm personnel so they may tend to other responsibilities on the farm. Vice versa, if farm personnel are running behind for whatever reason (short staffed that day, other chores or responsibilities that needed immediate attention, sorting hogs, spring planting, fall harvest, etc.) then that information should be relayed to the transporter so that individual can utilize that time some other way (get fuel, eat, rest, etc).
2) Transporters are an important part of the industry, especially in Michigan where the vast majority of market hogs are being transported to out of state packing facilities. A good working relationship is imperative, as the livestock transporter serves as the link that connects the pork producer to the packer for product delivery.
3) Transporters are invested in the industry as well (trucks, trailers, licenses, certifications, etc.). They too, are running a business to make a living.
4) For the farm - set clear expectations of the transporter. (Example: Biosecurity protocols which may include clean trailer, transporter has clean boots and clothes, where the truck and trailer are allowed on the farm, etc.)

In closing, I would like to thank this livestock transporter for taking the time out of his busy schedule to visit with me about his perceptions and thoughts on transportation management of hauling hogs. *In addition, I will warrant this respective transporter's decision to remain anonymous in regard to this interview.

The Effect of Stockpeople on Pigs

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The art of stockmanship enables some people to achieve a response from animals that cannot be achieved by others using the same responses and experience. Finding stockpeople with the appropriate character for the job is important to the productivity and welfare of pigs. Consider the example of a family farm that expanded its herd from 200 to 700 farrowing to weaning sows and thus required additional labor. The farm owners hired Rose, a neighbor, to work in the farrowing barns. She is confident, hard-working and methodical in her daily routines. Despite an initial lack of experience working with pigs, by 8 months at her new position, Rose had reduced pre-weaning mortality from 12.4% to 9.2%. Although anecdotal, this scenario is familiar to producers and veterinarians who recognize the traits of successful stockpeople. Data concerning the human factors that influence the relationship between people and animals has shown a considerable impact on the welfare and productivity of farm animals.

Interaction Between Humans and Pigs

Research indicates that the productivity of pigs is related to their interactions with stockpersons and that specific human characteristics (e.g. attitude and personality) are common in good stockpeople (2-8).

In a study using productivity records on 12 single-operator sow farms, Hemsworth and coworkers (1994), measured the behavioral response of pregnant sows to human handlers and compared these measures with the productivity performance of the sows (3). Sow behavior was measured by individual response to the hand of an approaching experimenter and the time taken to approach the experimenter. Productivity was determined by the number of piglets born alive per sow. On farms where the average number of total piglets born alive per sow was lowest, researchers observed a significantly greater withdrawal response to the experimenter's hand and slower approach behavior.

Positive and Negative Handling

Several studies have investigated the effects of positive and negative handling on behavioral and physiological responses in livestock (4-8). A study that measured behavior and growth performance in growing pigs demonstrated that a handling regimen of regular aversive treatments, resulted in increase avoidance of the handler by pigs and reduced growth rate in juvenile pigs. These effects are probably related to a chronic stress response. Stress hormones, such as cortisol, hinder growth and reproductive performance by disrupting metabolism and key reproductive endocrine events.

A study of male and female pigs indicated that the effect of aversive handling, minimal handling and positive handling, altered the behavioral, physiological and reproductive response of pigs (4). From 11 to 22 weeks of age, gilts and boars were handled three times per week in each of the three handling treatment groups (averse, minimal, positive).

When followed to maturity, the boars in the positive group, were able to breed sooner than those boars in the averse group. The gilts in the positive group maintained 87.5% pregnancy rate; in the averse group the rate was 33.3%.

Human characteristics

High quality stockpeople in swine production raise the standard of animal performance and make the business more successful. An evaluation of 12 experienced stockpeople confirmed characteristics such as conscientious, caring, eager to

learn, humble and careful observers, were associated with the development of a good relationship between the stockperson and pigs (9).

Attracting and training

Although many businesses advocate the use of advertisements, a recent summary of employee compensation in pork production sponsored by the National Pork Board (1) indicated that most employees find employment in pig operations by word of mouth or by referral. This system works well, because current employees know what qualities are needed to be successful and are wary of recommending anyone that would reflect poorly on their own character. One Michigan farm that comes to mind can boast 3% per year employee turnover with 100% of derived from their locale.

Improved attitudes toward pigs correlates to both improved productivity and animal welfare. The aforementioned farm as part of their operating procedures, trains employees quarterly on proper handling and transport techniques of swine, demonstrating a commitment to care and vigilance of animal welfare. Because of this commitment,they invited further training and MSU extension was given the opportunity to present training in low stress handling (LSH). This farm, reported that they still "learned something more" after the training and in a follow up survey to the training, 92.9% of respondents indicated that the LSH training increased their knowledge of handling pigs.

Interviewing

According to an old story, a farmer in need of a farmhand posted a notice in the village. Three promising youths responded, and the farmer met with each in turn. After asking the first youth about his background, the farmer asked a peculiar question. "Tell me, how long can you work with a stone in your shoe?" "Half a day," answered the youth. The farmer thanked him and sent him on his way.

The farmer then spoke with the second young man and again concluded with the question, "How long can you work with a stone in your shoe?" "All day long!" boasted the young man. The farmer sent him

on his way. When the farmer asked the third youth the same question, he responded, "Not a minute! When I get a stone in my shoe, I take it out right away." The youth was hired on the spot.

A good stockperson appreciates priorities and is willing to be side-tracked from routine duties to attend to animals in need, (9) which is not always evident in a traditional interview. In the earlier described 12 single-operator sow study, the scores given of stockpeople by managers and consultants relating to the technical skill, knowledge, work attitude and effort were not closely related to the fear response of sows to stockpeople (3).

One way to hire employees who are problem solvers (the ability to take information and sort through it and recognize what's working [10]), enjoy human-pig interaction and are motivated to learn is through a "hands on" interview. The applicant works in vari-

ous stations of the operation while the interviewer observes the applicant's ability to handle themselves and care for the pigs. The applicant is asked to move pigs down an aisle, place piglets into a cart at weaning, or clean out from behind sows. Even under supervision the unpredictably of livestock will demonstrate the applicant's problem solving ability. An inexperienced applicant who readily perceives that one tactic is not working and changes to another can develop into a stockperson capable of recognizing a pig's response, assimilating this new information.

Conclusion

Traditionally, the producer (farmer, owner, manager) of the swine unit was the stockperson and pig handling skills were passed down from the previous generation. The farm structure was such that family members worked together, and rarely dismissed another because of inappropriate handling of livestock.

As producers hire and train employees as stockpeople, many of whom are new to the industry, their attitude and ability can be shaped through constant information and on-farm training of best-management practices for animal handling and movement, animal health diagnosis and treatment, and other topics related to animal care.

Although I do not expect every person to consider stockmanship as a vocation, I am optimistic about the ability of the swine industry to provide rewarding careers to more people like Rose.

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Group Sow Housing – More Space or Less Sows?

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Introduction

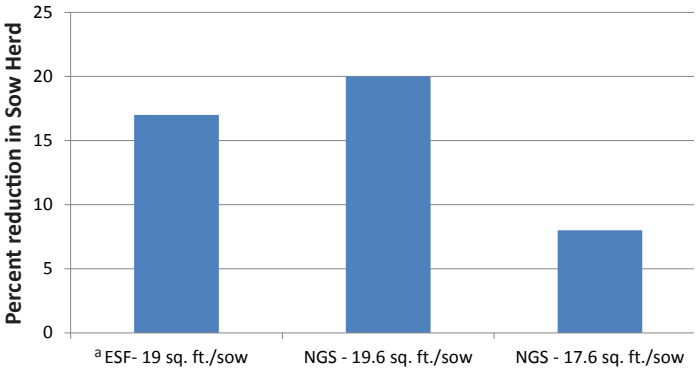
Pork producers in multiple states, including Michigan have legislative or regulatory mandates to house gestating sows such that they can turn around freely without impediment, lie down, stand up and fully extend their limbs. In addition many food companies have made statements that would ultimately cause their suppliers to comply with a similar mandate. The implementation of this mandate will cause producers to house sows in groups during gestation. The change from housing sows in stalls to group housing is not just simply changing the penning. There are critical sow care and welfare, productivity and financial considerations to evaluate. Pork producers that make this change must evaluate how their animal management and employee training program will change, what productivity differences may occur and how the initial capital costs as well as any changes in cost of production will ultimately affect their farm business. A companion article discussing different types of group sow housing feeding systems was published in a previous edition of the Pork Quarterly (Vol. 18 No. 3). This article will discuss remodeling of existing facilities and the space allocation per sow and group size.

Remodel/Add Space

Initially pork producers will have to determine if they will work within their present gestation footprint or add space. For the most part, stalled gestation barns may only have 19-20 sq. ft. per sow of internal space, including walkways. Sows in stalls are provided approximately 14 sq. ft., so space is used very efficiently. However, with group sow housing, gestating females should have a minimum of 16-20 sq. ft., dependent on their age, mixing strategy and body condition (Gonyou et al., 2013). Therefore if the existing structure only has 19-20 sq. ft. per sow of internal space to start with, adapting the existing space for group sow housing while providing more space per sow than in a stalled gestation barn suggests that either the sow inventory will be reduced or additional space is needed to maintain the sow inventory.

Dependent on the needs of the farm, a case can be made to reduce the inventory and therefore the number of pigs produced. Dependent on the age of the farm and grow-finish capacity, it may be beneficial to allow for an increase in sow lactation length and an increase market weight. With fewer sows, sows will be able to lactate longer and with fewer pigs marketed, pigs can remain in finishing longer and be heavier at market. This could allow the farm more flexibility to access different markets. Figure 1. is an example of the change in inventory, depending on the type of sow feeding system and layout chosen for an example farm converted to group sow housing using only the current gestation space in the facility.

Figure 1. Sow herd reduction when implementing group sow housing.



[a]The type of feeding system (ESF – Electronic Sow Feeding; NGS – Non-gated feeding stalls) is listed before the floor space allocation (sq. ft.) per sow.

Adapted from Levis et al., 2013

Within this example it was assumed that the flooring was partial slats. In traditional stalls the solid concrete would be under the front portion of the sow with slats behind. There were two feeding systems considered. Electronic Sow Feeding was one while the second was non-gated stalls which provided a short feeding stall that would enclose approximately the front one-third of the sow, leaving the back two-thirds of the sow exposed.

For this example the percentage reductions in sow numbers, ranged from 8-20%. Dependent on the existing restrictions in the barn including the feeding system chosen, the type of flooring within the barn, the pen layout, the floor space allocation per sow and the number of relief pens provided, the percentage change in inventory could differ.

A major challenge when remodeling an existing gestation barn is what to do with the sows during renovation. Some systems have developed a process that allows them to modify small sections of the barn that take 2-5 days at a time, dependent of sow flow. This process would continue each week, until the barn is renovated. Another option would be to reduce the sow herd by a few breeding groups in a weekly breeding system. This would allow for renovations to occur for 2-3 weeks in different sections of the gestation barn as the gestation "snake" moves through the barn. Modifications would still occur throughout a full gestation cycle.

This challenge of what to do with the sow herd during renovation often causes the farm to add to the existing facilities, which also allows the farm to retain or increase sow numbers. The addition to the existing facility allows the farm to build the additional space without disrupting the existing production flow. Once completed the existing inventory can be moved into the new space and subsequent renovations can occur within the existing gestation space as needed.

Design Specifications

Once the feeding system has been chosen and the fate of the sow inventory has been decided (i.e. reduce, retain or expand sow numbers), the design specifications have to be determined. Primarily this would include the floor space allocation per sow, number of females allocated per pen, number of pens for the facility and the number of relief pens to be used.

The floor space allocation per sow will be used to determine the fate of the sow inventory or if additional gestation space will be added to the farm. A general rule of thumb can be found in Table 1.

These estimates should be considered a starting point to determine what the floor space allocation should be. For example, the authors of these guidelines (Gonyou et al., 2013) recommend that when sows are housed in small pen groups (e.g. less than 10) floor space allocation should be greater than when sows are housed in larger groups (e.g. greater than 40). Floor space allocation per sow will also be a function of what type of feeding system is used and the number of sows allocated per pen.

The number of pens in the barn will be driven by the floor space allocation provided per sow and the number of animals per pen. It should be noted that breeding groups may not always have the correct number of animals to be placed within the gestation pens available. This is of bigger concern for static versus dynamic grouping strategies. Static grouping is

Table 1. Floor space allocation guidelines[a,b].

Item	Floor space allocation
Gilts	15-18 sq. ft.
Mixed groups of gilts and sows	18-23 sq. ft.
Mature sows	19-24 sq. ft.

[a]Adapted from Gonyou, H. and F. Rioja-Lang. 2013.

[b]More space per sow is recommended for smaller pen groups.

forming a pen group at one time without adding any more females once the group is established. Dynamic grouping is the regular mixing of sows throughout the gestation period.

For static grouping strategies, pens should be filled once and sows should not be mixed multiple times. Also the number of relief pens within the barn will influence the space available for group pens. Relief pens are pens provided so that sows that may become injured or moribund can be removed from the group pen and individually cared for. In a summary of several European recommendations, it has been suggested that relief pens comprise up to 5% of the total gestation space (Bates and Ferry, 2013). It should be noted however, that for the most part sows are provided straw bedding in many of the European countries that have these guidelines. If sows are housed on solid cement or slatted floors the amount of relief space needed could be higher.

In a review of the literature, it has been suggested that when competitive feeding systems are used for group sow housing (e.g. floor feeding, non-gated stalls, trickle feeding etc) small pen groups should be used and those pen groups should be static (Bates and Ferry, 2013). Of the two (small pen groups vs static groups) it may be more important that static groups be used for competitive feeding systems. Yet, it has been suggested that for competitive feeding systems, sows housed in small groups (10 sows) may experience less wounding compared to sows housed in moderate sized groups (20 sows) (Guthrie et al., 2012).

In addition, having a relatively small number of sows per pen for static groups allows for sows to be sorted by size and body condition more effectively. This will allow for better allocation of feed resources to meet the needs of the animals in the pen. Simply grouping gilts with gilts, small sows with small sows, thin sows with thin sows and heavily conditioned sows with heavily conditioned sows allows for improved feed resource allocation based on the body condition and size of the sows in the pen. Also there is indication that for competitive feeding systems, grouping sows based on their ability to compete for feed resources is more advantageous for their overall well-being (Gonyou et al., 2013).

Conclusions

As pork producers transition from housing sows to individual stalls to group housing they will have to determine if they plan to maintain the current sow inventory, decrease the sow inventory or increase the sow inventory. If sow numbers are to be maintained or increased the farm will have to add gestation space in many cases. Furthermore the farm will have to choose a particular feeding system, determine floor space allocation per sow, the number of sows to be housed per pen and whether to use static or dynamic groups. These decisions will ultimately form the transition to group sow housing and changes that will need to be made to the management plan.

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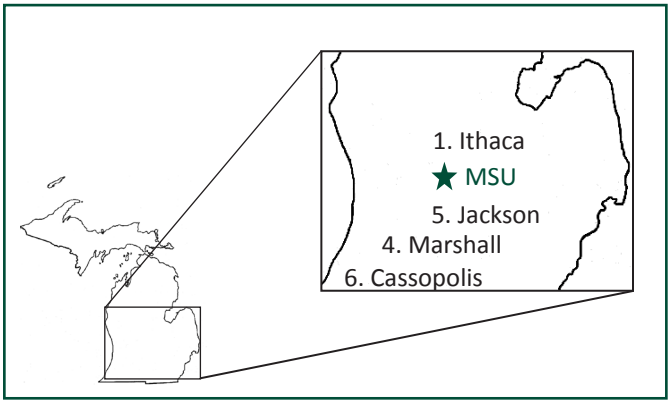

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