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BEEF CATTLE

Emergency Considerations for Beef Cattle

By Max Irsik and Todd Thrift2, University of Florida, IFA Extension. Hurricanes have the potential to cause severe damage to ranches and cattle production facilities. May 2008

Included among concerns about potential hurricane damage are considerations for animal care and health management before, during and after the emergency. The following guide is a general overview of beef cattle handling, care, and health concerns which may be associated with a natural disaster such as a hurricane.

Behavior, Handling, Animal Care

Handling practices can be less stressful to the animals and safer for the handler if one understands the behavioral characteristics of beef cattle. Cattle disposition or temperament ranges from docile to wild/highly excitable. Typically cattle with poor dispositions are very fearful of humans or they exhibit aggressive behavior. This behavior is neutralized when personnel handling cattle are experienced and understand the flight zone of cattle.

Behavior During Handling and Restraint

Cattle have a "flight zone." The flight zone of an animal is that space surrounding the animal that will elicit avoidance or escape when encroached upon. When a person moves inside the flight zone, the animal usually moves away. If a handler penetrates the flight zone too deeply (that is gets relatively close to the animal), the animal will either bolt and run, or, if cornered, turn back and run past, or over the handler.

The best place for the handler to work cattle is on the edge of the flight zone. In this position the cattle will move away from the handler in an orderly manner (will not show extreme flight behavior). The cattle will stop moving when the handler retreats from the flight zone.

The size of the flight zone of cattle depends on their relative degrees of tameness. The flight zones for cattle reared on the range may be many times greater than the flight zones of backyard or small farm cattle. It should be noted that excessively tame cattle can be very difficult to move or handle. Often the best approach is to try to get the animals to follow another animal.

The flight distance (distance from the animal to the edge of the flight zone) can be roughly estimated by walking toward the animal and noticing how close the animal may be approached before it starts to move away.

Flight distance can also be influenced by previous experience. Animals that have been handled gently and reared in close contact with people will have shorter flight distances than those that have been handled roughly or with minimal human contact.

Many people make the mistake of invading the flight zone too deeply when driving livestock. If the animals attempt to turn back, the handler should retreat from their flight zone. Retreating will usually terminate their escape behavior.

All species of livestock exhibit a strong tendency to follow. Both sheep and cattle are highly motivated to maintain visual contact with each other. Cattle show visible signs of distress when isolated. A lone steer or cow may injure itself trying to rejoin its herd mates and if highly aroused it may also charge a handler. When a lone animal refuses to move or is agitated, either leave it alone or try to introduce it to another group of animals.

Cattle can be handled most effectively by a person who understands their behavior patterns and who provides handling facilities that complement those behaviors in a positive way. Calm cattle are easier to move and sort than excited cattle. Once they are agitated it takes cattle about one-half hour to calm down. Most cattle are restrained and handled several times during their lifetimes. Ease of handling depends largely on their temperament, size, and previous experience as well as on the design of the handling facilities. Cattle are also creatures of habit and will learn from positive experiences. Some cattle will move/handle easily in response to a positive motivator such as feed.

Following are some important facts about the behavior of cattle.

1. Because cattle have 310- to 360-degree vision, they are sensitive to shadows and unusual movements.

2. Cattle tend to move toward light. (Except blinding direct sunlight.)

3. Cattle have poor depth perception and will often refuse to move through areas where shadows are cast on the ground.

4. Cows and calves handled in an abusive manner develop poor dispositions. Cattle remember painful and adverse experiences.

5. A small flag on the end of a stick is useful for moving or sorting cattle. Cattle should be moved without the use of a whip or electric prod.

6. Cattle usually respond negatively to abuse, loud noises, and other confusing situations that can excite them. Thus noisy equipment should be kept as far as possible from cattle.

7. Metal chutes and alleys should be constructed and used so as to eliminate loud clanging and banging noises.

8. Yelling at cattle increases the stress level of both cattle and handler.

9. Cattle are easily disturbed by loud noises, such as those made by pumps, and compressed air.

10. Cattle are creatures of habit. An established daily routine will result in ease of handling.

11. Handle animals in groups. A single animal will often resist going into a chute or pen by itself. It may become excited and injure itself or the handler.

12. The cattle handler's movements should be slow and deliberate: any sudden movement will frighten cattle and make them difficult to handle.

13. By understanding the flight zone of cattle, a handler can effectively work cattle in a corral or pasture. (Figure 1)

a. Cattle can be moved more easily if the handler works on the edge of the flight zone.

b. The handler penetrates the flight zone to start cattle movement and retreats outside the flight zone to stop cattle movements. When the handler is positioned behind the point of balance at the shoulder, the animal will move forward. It will move backward when the handler is in front of the point of balance.

c. The animal will move forward when the handler walks quickly past the point of balance at the shoulder.

14. If cattle refuse to move through a gate, into a chute or trailer, or even in a certain direction, check for distractions such as flapping coats, noise, objects on the ground, other animals (dogs), movement of people in direction of travel.

15. Round pens enhance cattle movement and prevent injury to excitable cattle.

16. Head catches are necessary to immobilize cattle of large sizes. If the head needs to be restrained, a halter is preferred to nose tongs.

17. Mixing groups of cattle can add to the stress of these animals and make handling more difficult. If groups are mixed, provide plenty of space and observe animals from a distance. Allow the new group to interact and start to develop a social order. The anxiety will be at the highest level for the first few hours after being mixed and will decline fairly rapidly over a few days.

Breed Differences

The breed of livestock can affect the way they react to handling. Brahman and Brahman cross cattle are more excitable and may be harder to handle than the English breeds. Angus cattle may be more excitable than Herefords, and Holstein cattle tend to move slowly.

Brahman cattle often display excitement or agitation by swishing their tails. When Brahman and Brahman cross cattle become excited, they can become more difficult to block at gates, may more readily run into fences and will run over the handlers.

Brahman cattle tend to be docile in the pasture but can be claustrophobic in the pens. They are also more intelligent than English breeds. This fact results in Brahman cattle being difficult to handle when they have had previous negative experiences during handling.

Well-Being and Animal Care

Animal care aims to fulfill animal needs. In order to know how to care for animals, their needs must be known and understood.

Physiologic Needs: Nutrition, Environment or Housing, Health

Nutrition

Feed

1. Beef cattle are ruminants and are thus able to use feed stuffs such as hay and grass. If possible provide cattle with access to grass pastures. If grass pastures are not available, provide grass hay as an alternative--1/3 of a square

bale/cow/day should be sufficient. Beef cattle are also able to use concentrates (grains) as a source of food. An excellent source and one which is highly palatable would be sweet feeds that are typically fed to horses. Feed approximately 10 to 12 pounds/cow/day.

2. In an emergency situation, mature beef cattle can survive for several days without feed.

3. Small calves <350 lbs nursing cows do not need additional feed, other than what is supplied to their mothers.

4. Orphan calves can be fed a commercial milk replacer. The amount of milk replacer supplied is typically 8% of their body weight. (i.e. a 100-lb calf would need approximately 8 lbs of reconstituted milk replacer per day). Patience is needed when trying to get an orphan calf to accept milk from a bottle or bucket, particularly if they have been used to nursing recently.

Water

Beef cattle need access to fresh water 24 hours per day. The amount of water required depends a lot upon the ambient temperature. Regardless of the types of feed supplied, beef cattle cannot go without water for any extended period of time (> 24 hours).

Beef cattle are able to use standing water as well as fresh water. Water with high levels of chlorine may be unpalatable. It has been noted by people showing cattle that animals experiencing a change in water source often decrease water consumption. Table 1 provides water requirements for cattle and other species.

Table 1. Water Consumption (gallons per day) for various livestock.

Beef cattle	20-25 gallons per head
Dairy cattle	10-16 per head
Horses	8-12 per head

Extremely hot weather could increase the high values another 20 to 30 percent.

Environment / Housing

A majority of beef cattle are reared in a range environment. Well-drained grass land with shade available for the entire herd should be adequate. Fencing should contain animals to a specified area. In general the smaller the area in which cattle are contained, the greater the need for higher quality fence. For example, a corral should be made of rigid material such as steel panels or wooden fencing materials or possibly woven wire. An electric fence for emergencies or a 4-5 wire permanent fence should be adequate for open pasture.

Health Concerns for Beef Cattle During an Environmental Disaster

Generally there are few if any medical emergencies for beef cattle during environmental disasters such as hurricanes.

The lack of available water may leave some animals dehydrated. The remedy is to provide fresh water as soon as possible. If an animal is severely dehydrated, fluids can be provided via a stomach tube. Adequate restraint would be necessary as well as advanced training on the technique for "tubing" a ruminant.

Lack of shade may cause heat stress or heat stroke. Moving animals during periods of high temperature and humidity may also lead animals into heat stress or stroke. Often for beef cattle in hot and humid conditions the best thing to do to prevent heat stress is to simply leave them alone.

Table 2 provides a chart for the temperature humidity index for animals. Remember it is the combination of temperature and humidity that determines the severity of the heat stress.

Use the temperature humidity index as a guide to heat stress. Listen to local or regional weather reports for the temperature humidity index (THI) for your area.

Some levels of concern include:

a. Above 75 THI - Heat stress on high-producing cows begins to decrease feed intake and lower milk production, especially in diary cows.

b. Above 80 THI - Severe heat stress may occur for cows on pasture. Shade and adequate ventilation are essential to minimize stress and animal loss.

c. Above 83-85 THI - Danger of fatal heat stress occurs.

Heat stress management plan should incorporate the following:

a. Have ample water available. 2-3 gallons of water per 100 lbs of body weight. Make sure of delivery capability.

b. If watering from a trough, 3 inches of linear space per animal may be lifesaving.

c. Avoid handling of cattle if at all possible.

d. Provide shade if possible.

e. Improve air flow if possible. Provide fans or ventilation for confined cattle.

Don't house animals in a small pen in direct sunlight without adequate shade, water and ventilation (air flow).

Emergency Medical Treatment

If beef cattle are in need of medical treatment during a hurricane, consider the use of local resources: local veterinarians, cowboys, and area ranchers.

If veterinary assistance is required to manage health concerns, more than likely restraint facilities will also be necessary. This will include equipment such as squeeze chutes, corrals, lariats, rope halters and possibly sedatives and or anesthetics. If facilities are needed, adequate preparation should be made accordingly. It may be necessary to consider euthanasia rather than treatment of some animals. If euthanasia is a consideration for severely injured animals, adequately trained personnel will be necessary.

Health concerns regarding debilitated, disabled, or injured cattle will often require a decision of either treatment, or euthanasia. Criteria to be considered to assist the decision making should include,

a. Pain and distress of the animal

b. Likelihood of recovery

c. Ability to get to feed and water

d. Diagnostic information

e. Welfare for the animal and humane considerations.

During an environmental disaster, beef cattle may have emergency needs for food, water, shelter and medical concerns. In reality, often the best option concerning the needs of beef cattle in a disaster, provided they are in no danger, is to note their location and the approximate number of animals, determine their ownership and then simply monitor the cattle for other needs. The owners of beef cattle, ranchers and cowhands are often the individuals best prepared to handle the emergency needs for their herds. These individuals may need assistance from other producers in the area and occasionally local disaster relief personnel. If producers do need assistance from disaster relief personnel, volunteers providing that assistance must have a basic understanding of beef cattle. In closing, the best approach with beef cattle may be to leave the animals alone, notify local authorities if necessary, let the ranchers and cowboys handle their cattle and provide emergency assistance when producers ask for it.

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Footnotes

1. This document is VM167, one of a series of the Veterinary Medicine-Large Animal Clinical Sciences Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date May, 2008. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

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Long Lasting Inflammatory Relief for Calves

Wednesday, July 02, 2008
UK - A new calf trial has highlighted the long-lasting effect of the Non Steroidal Anti-Inflammatory Drug (NSAID) Finadyne with the product continuing to act in animals for up to two days after treatment.

When compared with a control, Finadyne was still active at 48 hours after treatment whereas there was no difference between meloxicam and the control at 24, 36 and 48 hours after administration.

Finadyne brings temperatures down within two hours of treatment, which ensures animals feel better rapidly, explains Intervet/Schering-Plough livestock veterinary adviser Andrew Montgomery.

"We all know when we feel under the weather with a cold or fever, taking anti-inflammatories such as paracetamol or aspirin can soon make us feel better. The same applies with cattle," he says. "NSAIDs that tackle pain, inflammation and help lower body temperature are vital tools in the vet's armoury and their use alongside antibiotics can jump start recovery and quickly restore animal performance. In fact, tackling pain and inflammation are as important to animal recovery as killing the bacteria that cause infections.

"Getting sick animals eating again is crucial to recovery. But to secure the recovery your NSAID must be effective, reach and work in the inflamed tissues quickly and act at the target site for as long as possible," he explains.

BVD in Calves

ABSTRACT: Impact of persistent bovine viral diarrhea viral infection on the duration and level of shedding of Escherichia coli O157 in calves01.jun.08

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Sruti Sreerama, Michael W. Sanderson, Melinda Wilkerson, T.G. Nagaraja
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Objectives: The goal of this study was to determine whether calves persistently infected with bovine viral diarrhea virus (BVDV) and inoculated with Escherichia coli O157 will shed the organism at a higher concentration and for a longer duration than calves not infected with BVDV.Materials: Nine calves, 6–8 weeks old, persistently infected with noncytopathic BVDV and eight calves not infected with BVDV obtained from separate cow-calf operations were used in this study. BVDV status, positive or negative, of all calves was confirmed by repeated testing throughout the study. Both groups were orally inoculated with 109 colony-forming units (CFU) of five nalidixic acid–resistant strains of E. coli O157. All calves were examined daily, and fecal samples were collected three times a week for 55 days for detection and enumeration of the nalidixic acid–resistant E. coli O157. Calves were then necropsied, and samples from the gastrointestinal tract were taken for the detection of the nalidixic acid–resistant E. coli O157.

Results: Data analysis indicated no statistical difference in the concentration of E. coli O157 shed or the duration of shedding between the persistently infected BVDV calves and the control calves throughout the length of the study.

Conclusions: Our data indicate that persistent infection with noncytopathic BVDV does not play a role in the level or duration of shedding of E. coli O157 in cattle.

DAIRY CATTLE AND VEAL

Limit-feeding works, but issues exist

Dairy Herd Management
May 2, 2008

When limit-fed, heifers receive the “same amount of calories, the same amount of protein, only in less dry matter,” says Pat Hoffman, dairy scientist at the University of Wisconsin. One of the hallmarks of using this technique is the savings on feed efficiency. Research at the Marshfield Agricultural Research Station shows limit-fed heifers (gaining about 2 pounds per head per day) ate about 4 pounds less feed per day than full-fed heifers. Multiply 4 pounds by 1,000 heifers over one year, and “that’s a lot of feed,” Hoffman says. The Wisconsin research also shows a remarkable 10-pound reduction in wet feces per head per day. If you’re thinking about exploring this practice, here are some behavioral issues Hoffman has observed:

a.. Vocalization time increases. This is usually temporary and ends after 10 to 14 days.

b.. Eating time decreases. Heifers seem to stand around more rather than lie down.

c.. Heifers still sort feed. “Heifers will splay their front legs and sometimes pinch their back legs” to reach the feed they tossed away, so “push it up 45 minutes later,” Hoffman says.

Optimize time spent eating

Can feeding behavior tell you if a cow is going to get sick? You bet. A University of British Columbia study found that two weeks before calving — three weeks before clinical signs of metritis were even present — those cows that were going to get sick had reduced dry matter intake, says Trevor DeVries, dairy scientist at the University of Guelph in Canada. And in those cows with severe metritis, 81 percent of the variation in dry matter intake could be explained by variation in feeding time during the post-calving period. “We don’t really know the cause and effect here,” DeVries says. “But what we do know is that if you can get these cows to spend more time at the feed bunk, it’s likely that the amount of feed they consume will also go up.” This may potentially reduce the risk of disease in these cows as well.

Reducing Lameness in Dairy Cows

May 2008

Lameness in dairy cows is one of the issues being tackled by Welfare Quality®, an EU-funded research project designed to integrate farm animal welfare into the food chain by developing reliable on-farm welfare assessment systems and practical strategies to improve farm animal welfare.

According to researchers participating in Welfare Quality®, farmers significantly underestimate the amount of lameness in their herds and in doing so, not only risk reducing the welfare of their animals but also losing some of their profits at the same time. Though farmers estimate about 5% to 10% of their dairy cows

suffer from lameness, the average is closer to 25% of the herd. Lameness reduces the efficiency of a cow's milk production, with an estimated average loss of €200 per cow, per year. In other words, this welfare problem accounts for a loss of 5% to 10% of a farmer's annual income per cow.

However, thanks to research done in Welfare Quality®, some practical support has been developed that will help farmers shrink their financial losses while improving the quality of life for their cows.

A few practical tips…

When aiming to reduce lameness in the dairy herd, one of the first places to look is the housing system. Even in the narrow range of around one cubicle per cow, i.e. on average 0.85 to 1.15 cubicles per cow, the more cubicles there are available to a cow, the better off she will be. But not just any cubicle will do. The size of the cow in relation to the size of the cubicle is vital as are the softness and cleanliness of the lying area. If the cubicle isn't up to standard, this will increase the time that it takes a cow to lie down, which is a sign the stall isn't comfortable for her.

Just as important as the cubicle is the cow's diet. As a ruminant, the amount of forage she consumes is vital to the workings of the gut, yet at the same time she requires a lot of energy to produce the amount of milk required of her. A balance must be struck so that she gets enough energy but is also given enough forage to counteract the amount of acid that can build up in her rumen and cause lameness issues. According to research done by Welfare Quality® on herds that were fed on average 0 kg up to 0.44 kg concentrates per kg milk, the risk of lameness increases with increasing amounts of concentrates fed. However, simply reducing the amount of concentrates compromises the energy status in high producing cows so the challenge is in balancing forage and energy.

The most obvious place to look in terms of lameness is at the health of the hoof itself. Though diet can have effects on the hoof and hoof wall, it is important to keep the area where she walks and milks dry and clean from slurry. Welfare Quality® researchers looked into the best type of flooring and the answer isn't as simple as farmers might wish: cement floors, especially when slatted, new and abrasive, can damage the hoof and weaken the soles, causing lesions and eventually infections and abscesses. Also, such floors become slippery due to wear, yet alternative rubber floors are difficult to clean with standard manure scrapers and, especially when solid, can be slippery despite the soft surface. Finding a combination of favourable features of the two types of floor that works best in each particular situation may be a process of trial and error.

Getting a handle on monitoring

To reduce lameness in the dairy herd, it's vital for farmers to develop a monitoring and control strategy that will look at the basic steps:

a.. Diagnosis – what is the problem and how big is it?;
b.. Risk assessment – what is causing the problem?;
c.. Control strategies – what can be done about it?;
d.. And Monitoring – is progress being made?

Welfare Quality® is developing a DVD and web-based monitoring programme to assist dairy farmers in all of these steps. The programme includes worksheets that can be tailored to suit individual farms. It will be made available in English for free, welfarequality.net and we expect to advertise this service in autumn 2008 on the Welfare Quality® website www.welfarequality.net.

Animal welfare can be a difficult concept to pin down, and many people have their own personal views. Despite this, there is general agreement within the scientific community that animals should be housed in comfortable surroundings and maintained in good health, as described in the Welfare Quality® fact sheet 'Principles and criteria of good animal welfare'
(available on the website www.welfarequality.net).

The research on lameness done in Welfare Quality® has added scientific knowledge about root causes. Existing and new information has been applied in a webbased monitoring programme, which assists dairy farmers in addressing risk factors in a way that is tailored to their specific situation. Welfare Quality® is providing a means to effectively combat lameness in dairy cows and contribute to an economically efficient and animalfriendly dairy industry.

Footnote
This research was executed within the third Subproject of Welfare Quality®, which focuses on the development of practical strategies to improve farm animal welfare.

Welfare Quality® is a European research project focusing on the integration of animal welfare in the food quality chain. The project aims to accommodate societal concerns and market demands, to develop reliable on-farm monitoring systems, product information systems, and practical species-specific strategies to improve farm animal welfare. Forty-four institutes and universities, representing thirteen European countries and four Latin American countries, participate in this integrated research project.

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The text represents the authors' views and does not necessarily represent a position of the Commission, who will not be liable for the use made of such information.

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Feeding Dairy Cows for Body Condition Score

June 2008
The Dairy Site

Changes in body weight are not a very good indicator of the nutritional status of dairy cows, writes Alvaro Garcia and Arnold Hippen of the Dairy Science Department - South Dakota State University, Extension Extra.

For example, while the gut contents of a 1400 lb. dairy cow weigh approximately 200 lbs., the cow has a daily intake of nearly 100 lbs. of feed (fresh weight) and 160 to 240 lbs. of water (one gallon equals 8 lbs). In addition, the cow outputs over 120 lbs. of fresh manure and urine per day (NRC 2001), as well as 50 to 100-plus lbs. of milk. Thus, the ability to accurately depict actual changes in body mass via body weight measurements can be affected by daily fluctuations in body weight. A better method of evaluating the nutritional status of cows is through its body condition score (BCS).

Body condition scoring, while subjective, is a useful and practical visual assessment tool of the nutritional status of cattle. High percentages of repeatability, both between measurements and between scorers, can be obtained with practice. The scoring system usually in use for dairy cattle is a 5-point scale, with 1 corresponding to an extremely thin cow, and 5 to a cow with excessive fat deposits (Wildman et al. 1982). Photos of and a text description for each body condition score are provided at the conclusion of this publication.

High feed costs may sometimes lead to poor decisions when it comes to selecting feedstuffs for cattle at different physiological states. In general, in an attempt to maximize returns on feed dollars, high-producing dairy cows are offered the best feeds available. Similarly, to decrease overall feed costs, far-off dry cows are usually fed low quality forages. The latter approach, especially if extremely low-quality forages are fed, negatively affects the resumption of the cow's reproductive activity right after calving, while also increasing the incidence of health related disorders. Body condition score can be used routinely both to assess the nutritional status of different cattle feeding groups and to determine the right feed allocation (where it will have the greatest effect on income over feed costs).

Body Condition and Post-Calving Ovarian activity

For the first 4 to 6 weeks after calving, the cow's feed intake does not increase as fast as milk production does, which results in the mobilization of body stores. Thus, during the first two months of lactation, the extent to which a cow will lose body condition is determined by the balance between her nutrient uptake and her genetic potential for milk production. According to the NRC (2001), the equilibrium between tissue mobilization and accretion in an adequately fed cow can occur at approximately 60 days post-calving. Achieving this equilibrium as soon as possible is of importance because of the related increases in the percent of cows that resume ovarian cyclic activity (table 1). A faster return to ovarian cyclic activity is critically important because it both allows producers to shorten the voluntary waiting period (calving to first insemination) and reduces the calving interval. It has been demonstrated that the BCS recorded one month after calving had the largest correlation with calving interval, particularly in first-lactation cows (Price et al. 2000). Similarly, high-producing cows with low BCS five weeks or more after calving can be expected to have delayed estrus resumption. Cows with poor BCS had fewer normal oocytes than cows with higher scores, whereas follicle numbers were higher in cows with BCS of 3 to 5 (Dominguez 1995).

Table 1. Cow body condition at calving on the cumulative percentage return to estrus

Cumulative percentage return to estrus

Days after calving	40	50	60	70	80
Thin	19	34	46	55	62
Moderate	21	45	61	79	88
Good	31	42	91	96	98

Source: Wiltbank (1977).

Body Condition and Cow Health

An adequate body condition is very important for the maintenance of an animal's production, reproduction, and overall health. If improving body condition score to the optimum increases fertility, excessive condition can result in metabolic problems, particularly in close-up cows. Fatty liver can occur shortly before and after calving, during what has been termed "transition period." When faced with a reduction in intake, a cow mobilizes body fat, which increases both the concentration of circulating fatty acids and the fat deposits in the liver. Dry cows with body condition of 3 or less can be fed more energy in the diet to improve their condition with less risk of fatty liver. The risk is less because the liver does not deposit fat while in positive energy balance. On the other hand, the efficiency of depositing energy is greater while in lactation, so it is more important both to

achieve a desired body condition before dry-off and to maintain the body condition from then through calving.

Over-conditioned cows should not be “feed restricted,” as fat would be mobilized from adipose tissue—which will increase circulating fatty acids and, in turn, increase fat deposits in the liver. As many as 50% of the cows in many dairy herds have fatty liver (Gerloff et al. 1986). Fatty liver both negatively affects the outcome of other metabolic diseases (in particular, displaced abomasum and ketosis) and increases the cost of production. Kelton et al. (1998) suggested that clinical ketosis costs U.S. dairy farmers $62,640,000 yearly (4 to 8% incidence per herd, and $145 per case). Fatty liver is also associated with increased incidences and severity of laminitis, mastitis, milk fever, retained placenta, and metritis. In the long term, increased liver fat concentrations are associated with decreased reproductive success and decreased milk production in dairy cows.

Feeding for Body Condition Score

With high feed prices, a logical approach is to take a closer look at the efficiency of feed utilization (with the implication being that less feed may be used by an animal to produce the same amount of product). One problem is that improvements in feed efficiency early in lactation are heavily biased towards greater body energy mobilization compared to the feed energy supply. Figure 1 shows the evolution of suggested BCS and feed efficiency for milk production during an entire lactation.

Early in lactation, feed efficiency for milk production is artificially high (2.4) and results from a low initial feed intake paired with body fat mobilization. As a result, once feed intake starts to increase, in the first two months of lactation, the feed efficiency for milk production sharply decreases (hand-in-hand with increased feed intake); and feed efficiency continues to decrease through the remainder of the lactation. After the 8 week of lactation, the energy supplied by the feed tends to match that required for milk production. At this time, the cow starts to gain condition, whereas feed efficiency for milk production continues to drop steadily; this is represented by the two divergent lines in fig. 1.

Improving feed efficiency without taking a close look at body condition can thus negatively impact fertility, productivity, and overall animal health. In addition, feeding for body condition is very important to reduce the incidence of health problems. It has been suggested that a 1% increase in the variation of dry matter intake increases the likelihood of post-calving incidents by 4% (McGuffey et al. 1997).

Cows should end their lactation in the body condition that would be desirable at calving (e.g., 3.5) to avoid the need to add weight during the dry-off period. Body condition in excess of 3.5 to 3.75 during the dry period can lead to increased incidences of fat cow syndrome and fatty livers at calving, compared with condition gained during lactation. On the other hand, underfeeding dry cows,

either to make them lose excessive weight and/or as a result of feeding low quality forages or feed restriction, can lead to body fat mobilization and increase incidence of ketosis.

It is important to take into consideration cattle socialization as it relates to BCS. When first- and later-lactation animals are grouped together, they usually compete for available space. If BCS is to be maintained during the dry period, it is very important to ensure that there is enough feed bunk, water, and stall space for each cow. Feedstuffs used in the formulation of far dry-off cows are usually of lower digestibility/energy content. Differentiation has to be made between low quality that is due to less total digestible nutrients and low quality that is due to the presence of contaminants such as weeds and/or fungi growth. Feeds that are unacceptable for lactating dairy cows should also be questionable for dry animals. “Off-smells” due to contaminants oftentimes result in feed refusal, sorting, and/or uneven ration intake, all of which can affect BCS. Animals that have maintained adequate condition through the dry period can then, possibly, lose condition as a result of selective feeding.

Diets fed to dry cows should be balanced and palatable and formulated for a transition between the far-off dry period and early lactation. Moderately increase grain in the diet right before calving to increase the energy density of the ration, and reduce body condition losses right after calving. Even when all these measures are considered, energy demands early in lactation will lead to some body stores losses, particularly in the form of fat. One important measure is to manage rations for consistency of feed intake early in the lactation.

Body Condition Scores of Dairy Cows

Body condition score 1. Deep cavity around tailhead. Bones of pelvis and short ribs sharp and easily felt. No fatty tissue in pelvic or loin area. Deep depression in loin.

Body condition score 2. Shallow cavity around tailhead with some fatty tissue lining it and covering pin bones. Pelvis easily felt. Ends of short ribs feel rounded and upper surfaces can be felt with slight pressure. Depression visible in loin area.

Body condition score 3. No cavity around tailhead and fatty tissue easily felt over whole area. Pelvis can be felt with slight pressure. Thick layer of tissue covering top of short ribs which can still be felt with pressure. Slight depression in loin area.

Body condition score 4. Folds of fatty tissue are seen around tailhead with patches of fat covering pin bones. Pelvis can be felt with firm pressure. Short ribs can no longer be felt. No depression in loin area.

Body condition score 5. Tailhead is buried in thick layer of fatty tissue. Pelvic bones cannot be felt even with firm pressure. Short ribs covered with thick layer of fatty tissue.

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Colostrum volume impacts passive transfer

Calf and Heifer Advisor
July 14, 2008

Recent research at the University of Minnesota indicates that colostrum replacer volume matters a great deal when it comes to passive transfer. And method of delivery matters at low volumes.

Results presented at the Minnesota Dairy Health Conference showed that calves fed 3 liters (3.17 quarts) of colostrum replacer per day (200 grams of IgG) had significantly higher levels of passive transfer than calves fed 1.5 liters (1.159 quarts) of colostrum replacer per day (100 grams of IgG).

Calves that received the lower volume via a nipple bottle showed an average 10.6-percent increase in apparent efficiency of absorption of IgG over calves fed the same dose with an esophageal feeder tube. Meanwhile, passive transfer

seemed to be unaffected by feed-delivery method for calves fed the higher dose of colostrum replacer.

Calf diarrhea: A Gut-Level Green Issue

Fran O'Leary foleary
Farmprogress.com
April 22, 2008

Diarrhea in newborn dairy calves causes 62% of annual calf mortality and represents a large economic loss to the dairy industry, says Jud Heinrichs of Penn State University. Heinrichs spoke Monday at Alltech's 24th International Animal Health and Nutrition Symposium in Lexington, Ky.

"Viral pathogens destroy villus architecture and decrease the absorptive surface area of the small intestine," Heinrichs told the audience. "Loss of epithelial function results in poor absorption of water and other nutrients. Continued diarrhea increases the risk of dehydration and hypoglycemia and, if not treated, can lead to death."

According to Heinrichs, 8% of all live dairy heifer calves born in the U.S. die each year.

"Dairy heifer calves cost $700 each," he notes, "So, an 8% death loss is a huge loss for a dairy."

In their first 10 days of life, newborn calves rely on passive transfer of antibodies through colostrum from vaccinated cows.

Heinrichs says dairymen need to boost calf survival rates by decreasing the incidence of scours. To accomplish this, they should:

* Separate calves from their mothers quickly
* Feed them 1 gallon of high-quality colostrum within the first four hours of birth
* Raise the calf in a clean environment.

In addition to immunities to several bacteria that cause scours, colostrom is a good source of nucleotides.

"Nucleotides are NPN compounds found in many foods such as seafood, legumes, yeast cell contents and organ meats," Heinrichs says. "Nucleotides are often called "semi-essential" nutrients for young animals. Although the body is able to synthesize nucleotides, intestinal tissue that is developing or diseased requires supplemental nucleotides beyond what the body can normally produce."

In a study conducted at Penn State University, newborn calves received milk replacer supplemented with nucleotides. Results of the study showed calves on this diet had enhanced intestinal integrity, increased small intestinal absorptive capacity, an increased number of good bacteria in their intestines, decreased incidence of diarrhea and improved calf health without antibiotics, compared to calves not supplemented with nucleotides.

"Calves supplemented with nucleotides had longer intestinal villi and a more beneficial intestinal environment due to higher concentrations of L. acidophilus and Bifidobacteria," Heinrichs concluded. "Further evaluation of diet supplementation with yeast cell contents may lead to better calf health by improving intestinal morphology and function."

Four-step cleaning protocol for sanitary feeding

Dairy Calf and Heifer Association
June 9, 2008

Calves are exposed to enough bacterial pathogens in their natural environment without the challenge of hand-feeding them additional bacteria via bottles and pails, says calf-management expert Sam Leadley.

Leadley, calf consultant with Attica Veterinary Associates, Attica, N.Y., recommends a four-step cleaning protocol to ensure that calf bottles (or pails) help to minimize — rather than increase — a calf's pathogen load:

(1) Rinse the bottle in lukewarm water (105-110 degrees F) to get rid of surface dirt and milk residue. Do not rinse with hot water.

(2) Using a hot water solution that includes detergent and bleach, brush and scrub all surfaces of the bottle. The water should be at least 120 degrees F. "If I see someone washing bottles without using gloves, I know the water is not hot enough," says Leadley.

(3) Rinse the bottle using an acid solution (110-115 degrees F).

(4) Allow the bottles (and pails) to drain and dry. Do not stack pails or set them upside-down on a concrete floor. Drying racks that keep them separated and up in the air are ideal.

Read more of Leadley's tips and calf-management advice at: www.atticacows.com.

Consistency is key with newborn calves

Dairy Calf and Heifer Association
June 9, 2008

A challenge that dairy producers face with their newborn calves is consistency, says Calf-Tel calf-care specialist Lewis Anderson. Anderson has more than 30 years of extensive calf-raising and management experience. He recommends developing a standard operating procedure or SOP to achieve consistency with your calves. Here are some points to include in an SOP:

a.. Colostrum collection. Clean and prep fresh cows for milking as if their milk were going into the main bulk tank. Equipment, such as catch pails, should be just as clean. Anderson suggests using a colostrometer to evaluate colostrum quality.

b.. Feeding and storage of colostrum. Try to get fresh colostrum from the cow to the calf within one hour of harvest. If storing colostrum, get it from the cow to the refrigerator within 30 minutes and cool it to between 38 to 40 degrees F. Test the colostrum with a hand thermometer from time to time to see how long it takes to cool the colostrum. Store colostrum in 2-quart containers at 38 degrees F for no more than seven days. Anderson suggests using 2-quart size, wide-mouth plastic containers that are easy to pour out of. The lids seal tight and they can be placed in a dishwasher for cleaning. Make sure your refrigerator is in good working condition.

c.. Warm stored colostrum. Warm colostrum as soon as a calf is born. Set a bottle of refrigerated colostrum in a 5-gallon bucket of 130-degree F water. Using a standard thermometer, deliver the colostrum to the calf at 101 degrees F. It is the producer's choice to tube or bottle feed. "If you choose to tube feed, make sure employees are trained," notes Anderson.

d.. Separate calf from dam and dip navel. "By getting the calf away from the cow, you eliminate the opportunity for the calf's first meal to be manure," explains Anderson. "Get the calf into dry bedding, out of wind, under a heat lamp and dip the navel." He suggests dipping the navel prior to feeding.

e.. Other protocols to include. Ear-tagging, vaccinations, information about the birth, time of colostrum feeding and by whom.

f.. Posting and implementation of SOPs. SOPs can be written in English and Spanish and posted in the maternity area. Run through the SOP with your employees prior to posting it. Train everyone who works in the maternity pen. After training, do a review. "Too many times, dairy producers do the training, but there is no follow-up until there is a problem," says Anderson. "And, employee buy-in will provide more consistency and healthier calves." Listen to your employees who work with these newborn calves. They will provide you insight to

training needs and adjustments to your SOPs. Run through the SOPs with your veterinarian and custom calf-raiser, if you are using one.

PIGS

Making Weaners Eat

Source: April 14, 2008 PigProgress.net
Author: Dr Ioannis Mavromichalis

Not an easy task, sometimes even impossible. Pigs weaned without substantial pre-weaning feeding experience are almost invariably suffering from depressed feed intake post-weaning. And, this is a problem. The less weaned pigs eat the first week post-weaning, the less efficient they are throughout the growing finishing period. Plus, or rather minus (!), their health is in great danger during this transition period when stomachs remain empty. So, what can be done? Here's a short list that may be of some help. Not all recommendations work simultaneously in all farms, but at least one of them should be working in most cases. Health: This cannot be overemphasised enough. Sick pigs, even subliminally affected by some pathogen, never eat enough. Improving overall health status always improves feed intake and growth performance.

Management: With (proper) management we create an environment suitable for maximal performance. Without this framework, growth and feed intake are always impaired. Farm employees should be considered as your best assets and be constantly trained and encouraged to look after weaned pigs with care.

Temperature: Pigs that are too warm and comfortable may not venture out to seek food. Pigs that are hot always reduce their feed intake to avoid internal heat production from metabolism. Best results are obtained when pigs are kept at a temperature not higher than their lower critical temperature zone. This applies to the whole room, as hot spots should always be provided during the immediate post-weaning period.

Lighting: Providing continuous lighting during the first couple days post-weaning reduces the time pigs take to start consuming feed. In the dark, weaned pigs prefer to remain in the safety of their group instead of venturing out for feed. Past the first few first days, normal lighting schemes should be initiated.

Diet digestibility: Feed intake is linearly associated with nutrient digestibility. Nursery diets fortified with cooked cereals, milk proteins, fish meal, and simple sugars such as lactose and sucrose, are readily consumed by young pigs. In contrast, ingredients of poor digestibility promote bacterial proliferation in the hind gut often leading to scours. It pays off to use high quality diets!

Additives: Certain additives, such as antimicrobial agents, zinc oxide, copper sulfate, organic acids, and plasma protein, improve post-weaning growth performance and feed intake. An improvement of 10 to 50% in performance can be easily realised when the proper combination of such ingredients is used, but the response is more pronounced when health, facilities, and management are sub-optimal.

Mat-feeding: Post-weaning feed intake may be dramatically enhanced by spreading a small quantity of feed on floor-mats or on solid floors. This greatly encourages pigs to express their natural rooting behavior and ingest solid feed as early as the first day post-weaning. A mash provides equal results to pellets, but with pellets wastage is often higher. Placing the mat near the feeder seems to encourage pigs to consume more feed from the feeder. Gruel feeding: A gruel (50:50) of feed and water or liquid milk replacer offered to fallback and light pigs in bowl feeders during the first 2 to 3 days post-weaning can markedly improve the health and performance of these animals. This practice prevents starvation and more importantly, dehydration. Unless the gruel is gradually thickened (70:30), piglets may fail to adapt to dry feed. This technique is best combined with mat-feeding.

Shoulder ulcers in sows

Ontario Farmer
Thu 17 Apr 2008
Page: 18
Section: News
Byline: BY STEVE WOLFGRAM, DVM

In Denmark, where sows with shoulder ulcers are limited in how they can be shipped, some management aids have been developed

For several years, the Danish swine industry has been under increasing scrutiny from the public with respect to the development of shoulder ulcers in sows.

In Denmark, sows with shoulder ulcers are no longer allowed to be marketed for slaughter, and must be euthanized if the ulcer is severe. This has resulted in increased costs associated with sow mortality.

The issue of shoulder ulcers (or sores) is a prefect storm as far as animal welfare and animal rights activists are concerned because the damaged tissue is easily visible, and because discussions about shoulder ulcers generally lead to arguments about the negative effects of confinement housing on animal welfare.

Shoulder ulcers are very similar to a painful condition in people called bed sores or decubitus ulcers. In pigs the shoulder area is at a greater risk of developing

these sores. The bony spine of the shoulder blade puts a great deal of pressure on a relatively small area of skin when the sow lies down.

This increased pressure on the skin and tissues covering the shoulder results in compromised blood flow to these tissues, which can then lead to tissue death. Because lactating sows spend the majority of time lying down, they are at an increased risk to develop shoulder ulcers at that time.

Kathy Zurbrigg from the Ontario Ministry of Agriculture, Food and Rural Affairs published a study in 2006 which looked at the risk factors associated with the development of shoulder ulcers on an Ontario farm. On her study farm she found that body condition score at weaning, body weight (based on flank to flank measurements), parity, breed, litter weight at weaning, and floor type all significantly impacted the level of shoulder sores.

Danish Pig Production notes that lame sows and sows that have had a previous shoulder ulcer have a greater risk of developing shoulder ulcers.

Body condition at weaning is one factor that can be modified. The bonus here is that proper management of body condition has benefits that go beyond reduction in shoulder ulcers. Body condition needs to be monitored and corrected during gestation in order to see the benefits in the farrowing rooms.

Increased litter weight at weaning is related to an increased risk of developing shoulder ulcers.

If the sow's energy intake is insufficient to support milk production as well as maintaining body condition, there will be a mobilization of fat from the tissues over the shoulder as well as other areas of the body. The loss of padding leads to even more pressure placed on the affected tissues. It is also possible that heavier litters may originate from sows who spend longer periods of time lying down to let the piglets nurse. The longer periods of time spent lying down may put the sow at higher risk of developing an ulcer.

Floor type is not something that is easily changed, but rubber mats can be fastened to the floor in the shoulder area. In Zurbrigg's study, sows that developed shoulder ulcers that were given rubber mats in their farrowing crates healed faster than sows left on the regular flooring.

Danish Pig Production recommends placing high risk sows on rubber mats on entry to the farrowing crates, and placing mats in the crates of any other sows that develop ulcers while in the farrowing rooms. Danish Pig Production has developed a management plan for the handling of shoulder ulcers. This plan covers steps for prevention and treatment of the shoulder ulcers, and the management of the sows through to slaughter.

Shoulder ulcers are on the radar for animal rights groups. On websites for groups such as Vegetarians International Voice for Animals (Viva!), generalizations such as "Many breeding sows develop large sores..." are used to push their agenda. The Kinship Circle website, under the heading "Motionless on Metal", refers to a sow "marked with shoulder sores and eye abrasions..."

It is not hard to imagine a shoulder ulcer as a big bull's-eye sitting on the side of the sow, waiting for someone else to take aim.

We need to be proactive in resolving the issue rather than waiting for public pressure or legislation to dictate how we will manage shoulder ulcers.

10-point plan for handling of shoulder ulcers, from Danish Pig Production (www.danishpigproduction.dk)

PREVENTION

1 Assessment of the body condition through the entire cycle is crucial.

2 Individual feeding of sows also in the gestation facility.

3 Place at risk sows on a mat and check daily for shoulder ulcers on both sides, i.e.:

- Sows with a poor body condition score (conditions 1 and 2)

- Sows that have previously suffered from shoulder ulcers

- Sows that have difficulties when moving or sick sows

- Old sows

4 Solid, non-slip flooring beneath the sows in the farrowing pen.

5 Adjust the farrowing stall to the extreme position at transfer and again 1-2 days after farrowing.

TREATMENT

6 Relief with a mat already when observing reddening of the shoulder region.

- Inspect shoulder ulcers daily

- If the ulcer worsens, wean the sow and place her in a hospital pen with a bed of straw

OTHER MEASURES

7 Make a note on the sow table when the sow suffers from shoulder ulcers and note the side.

8 Sows with degrees 3 or 4 must be destroyed. Degrees 3 or 4 are considered neglect.

DELIVERY TO SLAUGHTERHOUSE

9 Inspect sows with scars on their shoulders or sows that you believe have previously suffered from shoulder ulcers. These sows must be inspected carefully before delivery to the slaughterhouse.

The slaughterhouses are under obligation to report degrees 3 or 4. If you see and feel the points below on a sow before delivery, there is a high risk that the sow has suffered from degrees 3 or 4:

- A firm swelling possibly with crust and reddening

- A large swelling (more than 5 cm in diameter)

- Immovable swellings

Gestation stalls are on their way out; so now what?

Responsible Pork 2008 Symposium
February 2008
By Stuart Lumb

Given that Smithfield, as well as Elite Swine in Canada, have committed to phasing out gestation stalls, loose housing has become a hot topic.

Before stalls, and even tethers, became popular in the late 1960s and early 1970s, the normal way to house gestation sows was in groups in pens, yards or dry lots. However, those were the days when a 100-sow unit was considered large. The wheel has now turned full circle.

In the United Kingdom, stalls and tethers were made illegal as of Jan. 1, 1999. The rest of the European Union will partly ban stalls by 2013. Producers will be able to put sows in stalls for the first 30 days after breeding, to allow the fertilized egg to implant.

Management certainly is easier and less time-consuming with stalled sows versus those kept in groups. While pork producers put sows in stalls for obvious

reasons, the public doesn’t understand that sows can be very aggressive animals.

Still, the data tend to show little performance difference between sows housed in groups and thosse in stalls. (See table.)

In the United Kingdom, gestating sows are kept in static/fixed groups or in dynamic groups. The big problem with dynamic groups is that sows get mixed in and taken out. This results in fighting, as animals have to re-establish a pecking order. Because the UK government’s ban keeps sows out of stalls immediately from weaning up until farrowing, sows are loose in groups at critical times — when the fertilized egg implants in the uterus (12 to 14 days after breeding). Mixing sows at this time can affect implantation.

Ideally, sows should be kept in the same group from weaning until just before farrowing, and then return to the same group. That is the static-group concept.

So, let’s take a look at some of the other group-housing systems.

Electronic Sow-feeder Systems: This system was adapted from dairy cow feeders. One ESF station can handle about 50 sows. Each sow has a transponder ear tag which activates the feeding station. A sow can eat dry or wet feed, and typically consumes its feed allowance in one visit. The system’s major advantage is that each sow is fed individually, according to her feed curve. Sows can be spray marked for pregnancy diagnosis, medication needs and other animal-care issues. A shedding facility can be incorporated to house sows that are due to farrow.

Most of the other systems work on a flat-rate feeding system, which makes it vital that sows are grouped by size. Otherwise bullying is a problem, with some sows getting too fat and some too thin.

Trickle-feed Systems: Here, sows are kept in small groups, and small metal dividers separate them while they eat. The daily feed allotments drop slowly — or trickle — into the trough at a rate so that the sow can consume the feed easily.

Free-access Stalls: With this system, each sow has access to a stall with a back gate that she can activate to leave whenever she wants; other sows cannot enter the stall once it’s occupied. Feeding occurs at a flat rate via an auger system, although you can provide extra feed by hand.

Spin-feeder System: A feed hopper is suspended above a group of sows. Feed pellets drop onto a spinning disc. The pellets are then dispersed over the pen floor. This system requires a solid floor.

Dump-box Feed System: This has been popular in the UK because of its low cost. The feed hoppers, or dump boxes, are suspended over the pen. A cone inside the box disperses pellets onto the floor at feeding time. Each dump box will feed six to eight sows. Again, a solid floor is needed. One problem with the system is that timid sows can get pushed out of the way and end up underfed.

Trough-fed Group System: Liquid feeding of byproducts such as whey and potatoes is common in Europe, as well as feeding ground meal and water. Sows are grouped in pens with a trough running through it. It's critical that sows are sorted and sized to prevent bullying.

Other lessons? There are floor-space recommendations in the UK; for gilts, it's 1.64 square meters per animal, for sows, its 2.25 square meters. When sows or gilts are kept in groups of 40 or more, the unobstructed floor space can be reduced by 10 percent.

In pens with slatted floors, pen design and layout are important, such as the ratio of solid areas to slats.

Sow temperament is definitely important in group systems. Certain breeds and crosses are better suited to group housing.

Remember to involve your staff in the decision-making process. It doesn't pay to put in an ESF system with state-of-the-art computerization if the workers who have to run it are technophobes. Having spare parts and technical back up is important, too.

Naturally, stockmanship and group housing go hand-in-hand. Stockpersons must handle sows daily in a gentle and quiet manner. This will let sows be more comfortable during things like pregnancy checking and giving injections.

When the UK sow-stall ban became law eight years ago, many hog farmers were adamant that it would be unworkable to house gestation sows in groups. They were proved wrong. Adapting to group-sow housing is just another challenge that the U.S. pork industry will successfully overcome.

Loose-housed sows versus stall-housed sows

The data presented here suggest that sows kept in groups are not disadvantaged in terms of pigs born alive per litter, compared with sows housed in stalls. In fact, the opposite is true. Management will dictate the outcome, and that may take some time to adjust.

	Number of sows (average)	Number of herds	Average pigs born alive (per litter)	Litters per sow per year (average)

Loose	286	96	11.09	2.29
Stalls	43	39	10.82	2.29

Source: PIC UK Pig Management Yearbook

The Pros and Cons of Individual and Group Housing

Tuesday, May 06, 2008
The Pigsite

MISSOURI - At the Missouri Pork Expo, Tim Safranski, University of Missouri Extension swine specialist reviewed individual and group housing and described the pros and cons of each.

He said either option can work with proper pig care, which improves performance in any system. Proper care means ensuring basic needs like food, water and protection from weather, Mr Safranski said. It also means reducing hazards and competition and allowing sows to express most normal patterns of behavior.

Pig welfare depends not on the use of gestation stalls or group housing but on the quality of individual pig care, said Mr Safranski University of Missouri Extension swine specialist.

"Managed correctly, any of the housing systems can work. If we look at the body of scientific literature, it doesn't matter how sows are housed. It matters more how they're cared for," said Tim Safranski.

At the Missouri Pork Expo, Mr Safranski reviewed individual and group housing and described the pros and cons of each. He said either option can work with proper pig care, which improves performance in any system.

Proper care means ensuring basic needs like food, water and protection from weather, Mr Safranski said. It also means reducing hazards and competition and allowing sows to express most normal patterns of behavior.

"With all the sow-housing options, gestation stalls fit most of those. Group housing could fit most of those. None of them really fit every point perfectly," he said.

Mr Safranski cited a 2005 paper from the American Veterinary Medical Association that concluded that "no existing housing system for pregnant sows is better than another."

Overall, stalls prevent fighting, reduce stress and injury, and make vaccinating, medical care and artificial insemination easier. Stalls also make individual care much easier, Mr Safranski said. "We can control individual feed intake: get those skinny sows more food, give those fat sows less."

But stalls restrict movement and some natural behaviors, like socializing and foraging. Limited mobility may cause joint stiffness. Stalls also make sows entirely dependent on humans for basic needs and physical comfort.

With sows in stalls, daily observation is critical, Mr Safranski said. An exercise pen may help sows showing signs of difficulty. "If we see a sow having trouble walking, giving her space to exercise and stretch may help the system overall be more productive," he said.

Group housing makes specialized care and feeding harder, but also allows sows more social interaction and movement.

Sow groups range in size from five or six sows to 80 or more. Group size affects management issues like sorting, daily observation and whether new sows can be added.

With small groups it is essential to sort, creating groups based on size, appetite, body condition and speed of eating. With 25 sows, for example, five or more groups are needed. "Somebody's still going to be the boss pig, he said, "but if we can at least get them even to start with, they're going to stay a lot closer to uniformity than if we don't."

Once created, small groups should remain fixed. Changing sows will increase fighting and producer costs. If sows must be mixed, it's helpful to mix them into a new pen to reduce territorial behavior. "Get them all out, walk them down the aisle and put them somewhere else," Mr Safranski said. "That way, nobody's invading my house; I'm moving into a house with strangers."

Pens must also have adequate space. This can be hard, as very little data exists on how much space group-housed sows need, Mr Safranski said.

With large-group housing, the idea is that sows fight less because they can't figure out who the bullies are, Mr Safranski said. This allows for dynamic groups that can be continually mixed. Broad sorting is still helpful to account for different feeding needs or temperaments.

Observing individual sows is still harder, which can complicate breeding, vaccinating, heat checking and control of individual feed intake.

Trickle feeding or electronic sow feeders offer possible technological solutions for the feed dilemma of group housing. Each has pros and cons.

Limiting sow stress just after mating can also improve group housing, Mr Safranski said. "Sows are most sensitive to stress from the time of mating to about 30 days after," he said. "If we can avoid stressing sows from group housing during that period, it adds value."

After that, sows can physiologically handle a lot of stress, such as fighting, which is associated with group housing, and still maintain pregnancy.

Mr Safranski said the European standard combines both housing types. Groups are used post-weaning to deal with stress, help sows cycle and sort those in heat. Sows ready for mating move to the boar area to be mated. They remain in a stall for 30 days then return to groups.

Regardless of housing type, the key is attention to detail, Mr Safranski said.

The Key to Making Pen Gestation Work

Source: April 25, 2008 Pork Board.org

With over 50 years of hog-raising experience under his belt, Dale Keesecker has seen and tried any number of new products and management practices. In those five decades, the Washington, KS, producer has also tested numerous products and management philosophies under the cooperative guidance of the Kansas State University (KSU) swine Extension staff. Keesecker began moving sows to confinement in the mid '90s, devoting one gestation barn to sows in stalls, another to gilts housed 10-12/pen. Roughly 75% of the sows were housed in stalls, with 25% of sows and gilts in pens. In the mid-'90s, he also began transitioning to multi-site production. “We moved nurseries and finishers off site and converted those barns to pen gestation,” Keesecker explains. “That was about 13 years ago. It was not an animal welfare decision.” Today, the split between sow stalls and group housing of sows and gilts is about 50:50. Still, as concerns about gestation stalls mounted, this forward-thinking Kansan once again joined forces with the KSU staff to study group size and feeding options for gestating sows. Keesecker had plenty of experience with hand-feeding sows in pens, but he wanted to learn more about automated drop feeding and whether the number of feedings per day mattered. “We were starting to read about various gestation housing alternatives and feeding regimes, so we were interested in learning if there was a better way to manage the pens. We had done countless studies with the KSU researchers at Manhattan, so they knew we were open to new ideas,”

Keesecker explains.Feeding Frequency Trial: In the field trial, 208 sows and 288 gilts were fed either twice a day (7:00 a.m. and 3:30 p.m.) or six times a day (7:00, 7:30, 8:00 a.m. and 3:30, 4:00 and 4:30 p.m.). Sows received 5.5 lb. of feed daily, while gilts received 4.5 lb. Thirteen replicates of eight sows/pen and 12 replicates of 12 gilts/pen were included in the trial. Weight, backfat, and standard measures of reproductive performance were recorded. In addition, various measures of animal well-being were collected, such as body lesions and vulva lesions scores (1 to 4), visual scores for structural integrity — front and rear legs and hooves. The eight-month study did not yield remarkable differences in the two feeding regimes. Weight gain, backfat change and variation of body weights of the groups were similar. Reproductive performance was also similar. Sows fed six times a day were noisier than those fed twice, but the latter groups had more body and vulva lesions. Sows fed twice a day also had slightly more feet, leg and hoof problems. (See p. 12 for complete details and results of the study.)

Pros and Cons: Although sows and gilts on the two feeding regimes performed similarly, Keesecker and his long-time breeding-gestation manager, Rick Richard, recounted some of the day-to-day advantages and disadvantages they saw with the drop-feeding systems.

Advantages: “More consistent feeding levels than hand-feeding. When feed is metered, you actually know what sows are getting. If a herdsman is feeding with a scoop, the amount of feed given per sow could vary, depending how full the scoop was and how big of a hurry he was in. “Better sow condition than hand-feeding, overall; “It's quieter; sows don't associate the feeding with the herdsman being in the barn. You don't have all of the noise and commotion and excitement going on that you did with hand-feeding. “It's much, much easier to adjust the feeding levels, because you just adjust the feed drop rather than trying to tell a person that we need to increase feed per sow by two or three tenths of a pound per day. “Sows were calmer and quieter the more drops we did. When the study was over, we went to the three in the morning, three in the afternoon feed drops. Sows are more consistently calm. Although the research might not bear this out, from visual observation, it looks like (there are) less problems with pecking order and boss sows when we drop feed more times per day.”

Disadvantages: “Compared to stalls, one thing you lose with the drop-feeding system is individual control. If you need to treat an animal or you want to read a tattoo, you can't just walk through and get it at a glance (in group housing). You'll have to figure out how to contain her. “We had a very small percentage of sows that would get aggressive, and we'd have to remove them and put them in stalls. That can mess you up, logistically. “A very small percentage of really timid sows just wouldn't adapt to floor feeding - even with six-times-a-day feeding. When they start to lose condition, you have to pull them. “One of the things that always bothers me about pens vs. stalls, is what could happen if someone were in a pen

of sows and got knocked down, and knocked unconscious; they probably wouldn't come out of there alive," Keesecker adds. "I know that's an extremely remote possibility. Pigs generally won't hurt you on purpose, but accidents do happen." Managing Pens : Keesecker and Richard feel they have learned a few things that could help other pork producers manage sows in pen gestation. Newly weaned sows are moved to stalls in a wing of the breeding-gestation barn. Once found in heat, sows are inseminated twice. The gradual move to more pen gestation has left them so tight on individual stalls that they now must move recently bred sows out of the breeding area the next week. "Pen gestation requires a different style of management, and there are more things that you need to do to make pens work right," states the veteran manager who has been at Keesecker Farms for over 17 years. One of the bigger challenges with sows in groups is "feeding to the averages," says Keesecker. "Basically, you have to pre-organize the sows," says Richard. "Sort them by weight, backfat and condition and set the feed drops accordingly." Although their field trial found no real advantages to feeding six times a day vs. twice, Richard prefers the more frequent feeding. "Even with the twice-a-day feeding, sows still tend to associate the herdsman with feeding," he explains. "The sows fed six times are just calmer." "If you get a really aggressive animal - one that just won't quit - you have to pull her out," Keesecker says. "They're like the bully that just never quits." At the opposite extreme are the timid sows. "We still get individual sows that are timid and don't want to eat with the group. They, too, must be pulled and moved to an individual stall," Richard adds. "On a day-to-day basis, it is harder to check for sows that are recycling in pens. It takes more skill to find those sows," he says. "It also makes preg-checking a little more difficult, but we don't seem to miss many."

Building New — Pens or Stalls? Keesecker doesn't hesitate when asked which sow housing option he likes best. "I prefer stalls," he says plainly. Richard admits if someone had asked that question before they conducted the trial, he'd have opted for stalls, too. "No way would I have wanted pens," he says. "But I feel a little more comfortable now that we have some experience with the feed drops and floor feeding. I like the consistency of the automatic drop feeders. You don't have to worry whether someone is feeding the sows the same way every day. "When we were hand-feeding, people tended to give each pen the same number of scoops without regard to the number of sows in the pen or the condition they were in. It's one of those jobs that people do without paying attention. If you have 40 pens to feed, and you have a barn full of squealing sows, one of your objectives is to get to the other end of the barn as quickly as you can." If he were making plans to build a new gestation barn today, Keesecker says, "I'd still have to look at stalls. We've got some projects that we're going to tackle in the near future and I'm really struggling with that. It costs less to go to pens and they're faster to build, but you lose control of the individual animals — their care and treatment. And there's more risk to the herdspeople." Richard agrees, but if you're sold on pens, he advises: "Think ahead about how you will manage it. I would go with smaller pens. Shoot for as much individual control as you can get."

And he prefers to house replacement gilts in pens because it's easier to check heat and gilts tend to grow better. “It helps their leg structure,” he says. “Remember, they're still developing; they're like a juvenile.”

Better Beginnings for Pigs in New Type of Pen

By Senior scientist Lene Juul Pedersen, Department of Animal Health, Welfare and Nutrition, Faculty of Agricultural Sciences, University of Aarhus.

Floor heating in the farrowing area reduces piglet mortality, according to studies of a new farrowing pen prototype. In their design of the pen, scientists have taken natural sow and piglet behaviour into consideration.

Scientists have developed a new type of farrowing pen that ensures the sow and her piglets improved conditions. One of the features in the new pen is floor heating in the farrowing area, which has been shown to reduce piglet mortality with an average of one piglet per litter. What the scientists have done in their design of the pen is to take natural sow and piglet behaviour into consideration.

There are many challenges at the onset of your life if you are a newborn piglet. Your first task is to find a good spot at the milk bar on your mother’s udder in hefty competition from 10-15 littermates that all have the same idea. A newborn piglet is programmed to seek the sow’s udder to tap a drink of colostrum as one of the very first events in its life in the pigpen.

Another prime challenge for the piglet is to stay warm while it lies by the udder sucking fortifying drops of milky nourishment. Even though the ambient temperature in the farrowing house is about 20°C, it can feel rather chilly for a new pig that has no furry coat or layer of fat to speak of. The new piglet is very small compared to its enormous mother – and herein lies yet another challenge. The piglet needs to ensure that it is not in the wrong place at the wrong time. If a piglet weighing one kilogram is squashed under its 250 kg heavy mother when the mother lies down, then that can be the end of the piglet.

New pen with built-in security Warm and safe surroundings are necessary to ensure as low a piglet mortality as possible. That is the whole idea behind the prototype for the new farrowing pen that has been developed in close collaboration between scientists from the Faculty of Agricultural Sciences at the University of Aarhus, KU-Life and Danish Pig Production.

In most modern sow houses the sow is placed in a traditional farrowing pen with a rail that limits her freedom of movement in the pen. Fixating the sow is done because of a belief that it reduces the number of piglets that are squashed by the sow.

However, there is no clear scientific proof that fixating sows reduces piglet mortality. In addition, there are welfare problems related to fixating the sow.

- Our goal is to develop a type of pen for loose sows and their piglets. Our focus has been to reduce piglet mortality, which on a national average is 23 percent including stillborn pigs, but we would also like to include the welfare of the sow and her requirements, says senior scientist Lene Juul Pedersen from the Department of Animal Health, Welfare and Nutrition at the Faculty of Agricultural Sciences, University of Aarhus.

- The sow has a strong behavioural requirement for nest building and parental care. She prefers maintaining contact and observing her offspring at all times. She gathers them, herds them to a side and knows where they are before she lies down – if she has the possibility for doing so, says Lene Juul Pedersen.

She can be given that possibility with more room and no fixation. In order to motivate the sow and the piglets to stay in the “right” places at the right times, the scientists are taking advantage of the knowledge of the animals’ behaviour.

Safe conditions for the sow and her offspring The sow likes to support herself against something when she lies down. The new pen has sloping walls that do not go all the way down to the floor. The lower part of the sloping wall is just far enough away from the pen wall and just high enough off the ground so that the piglets can escape to safety under the wall. With the sloping walls the sow can glide down and the piglets have time to run out of the way. It also creates a room in which the piglets can go to catch a peaceful nap.

Behind one of the sloping walls there is enough room for all the piglets to lie stretched out – even when they reach the age of four weeks. This is in contrast to the covered creep areas that are commonly used in which conditions get rather crowded once the pigs are about one week old.

The sow’s udder exerts an unresistable attraction to piglets on the lookout for colostrum. The little pigs will therefore be driven to the udder area even if the area is cold and the creep area is warm (as is the case in traditional farrowing pens). In the new pen, the lactating sow lies on a solid, heated floor. On the basis of the project’s studies on the importance of floor heating for piglet mortality, this arrangement has been proven to save the life of on average one pig per litter.

- Pigs that are chilled shortly after birth are predisposed to disease, hunger and being lain on by the sow. The first few days are critical, says Lene Juul Pedersen as an explanation of the life-saving effect.

Privacy ensured
For the sake of hygiene in the pen and an easier workload for the farmer, it is important to ensure that the sow does not defecate in the wrong end of the pen.

The scientists also use their knowledge about sow behaviour in this area in the design of the pen. When the sow builds a nest and when she has piglets, she prefers to be on her own.

Therefore, there is a solid wall separating the sow and her neighbours in the area where she and her piglets spend their time. However, in the dunging area there are bars instead of a solid wall, so that she can see her neighbours. That is usually enough to put her off hanging around in that area for more time than required to do her business.

The new pen prototype is more expensive overall because fewer pens can fit into the same number of square metres in the farrowing house and because of the cost of heating the whole pen floor. However, the individual pen is cheaper to build because there are not as many fittings in it. It is also easier to clean.

The project, which has run for five years, is co-financed by the Innovation Law and the participating partners.

Facts about farrowing pens:

Farrowing pen*	Creep area
Recommendations from Danish Pig Production	4,9 m2
Pens common in Danish pig houses	4,1 m2 0,3-0,6 m2
Prototype	6,5-7,2 m2 1,3 m2

*In order to have enough room for all pigs in a litter to lie beside each other and suckle simultaneously (which is what they normally do) and all sizes of sows, then the requirement is 5,3 m2.

Making It Work: Housing Gestating Sows in Group Pens

The Pig Site
Friday, May 30, 2008

CANADA - With the current social trend in sow housing is away from gestation stalls, the change has lead to Ontario pork producers examining management skills to facilitate the change from gestation crates to group housing.

The Ministry of Agriculture for Ontario has now listed are a number of practises which have been shown to reduce aggressive sow behaviour when housed in group pens.

The following suggestions are listed in order from the least to the greatest difficulty (based on labour and cost) to implement.

1. Wean sows into breeding crates

It is imperative that your facility have enough breeding crates to hold the required number of sows for the time they will be crated. Crates prevent the injuries associated with sow activities during estrous. Many producers hold sows in crates until after 28 day pregnancy confirmation. Others have success when sows are mixed after 7 days in the crates or immediately after breeding. Implantation typically occurs 12-14 days past breeding, so it may be best to group sows before or after this time.

2. Add extra feed to the floor of the pen before sows enter.
This is a distraction device. Some people, where possible, add a bag of shavings to the floor. Sows become engrossed in eating or exploring their environment, and tend to fight less. It also helps to feed up to one and a half times the normal daily feed rations for two to three days after a group is mixed.

3. Add a boar to the pen
The boar's role of "leader" keeps aggressive encounters between sows to a minimum. It takes a boar of a stable temperament, neither too aggressive (attacker) nor too passive (attacked), to perform this role well.

4. Mixing times
Try mixing at the end of the day then turn out the lights. This action, plus extra feed, leads to sows that are full in a dark, quiet environment.

5. Sow size in groups
Try for as uniform a sow size as possible. Very large or very small animals in a group can lead to overly dominant or overly submissive behaviour. Small sows or gilts can often be overly aggressive.

6. Group size (20 or more)
Larger sized groups reduce aggressive encounters. It is easier for a pursued sow to hide in a large group. It appears that if sow numbers are over 20, the animals give up on establishing a hierarchy. Smaller groups of 10 or less tend to establish strict hierarchies.

7. Partition walls
Walls can be of cement or of hanging rubber mats, or of sections of pen dividers removed between adjacent pens. This gives sows a place to escape to when pursued and some choice as to a pen location they may choose to congregate in.

8. Spread out the feed
Most aggressive encounters occur during feeding. Spreading the feed over the floor reduces sow encounters. The addition of an inverted Y or a cone distribution to the feed drop can do this reasonably well.

9. Multiple feedings

On once a day feedings, anxiety prior to feeding causes sows to hoard feed and increases fighting. Feeding from three to eight times per day results in calmer sows at feeding.

10. Suggested innovation
Much of this work is still in the development stages and it is suggested that one well laid out mixing pen be used for the week after sows are taken out of the breeding crates. At the end of this week they can then be moved into traditional and possibly less than ideal loose housing systems.

Effect Of Drinker Type On Water Intake And Waste In Newly Weaned Piglets
Source: June 26, 2008 AASV

During the first few days after weaning, pigs often experience BW loss as they adapt to eating solid food. During this time period, they are also known to drink excessively and develop abnormal oral behavior such as belly nosing. The excessive drinking may stem from the piglets' attempt to satiate hunger through gut fill from a familiar ingestive source. Gut fill through water intake may affect the establishment of feeding behavior. Using drinker devices other than the standard nipple drinker may ease the piglets' transition at weaning by facilitating the initiation of feeding and preventing the development of behavioral problems such as excessive drinking and belly nosing. In this experiment, we examined the effect of drinker type on water and food intake, growth rates, and belly nosing in newly weaned piglets.

Eighteen pens of 15 piglets each (270 piglets total) were weaned at 18.1 ± 0.1 d of age and housed in pens containing 1 of 3 drinker devices (standard nipple, push-lever bowl, and float bowl). Piglets' water and feed intake, water use, BW, and behavior were examined on a pen basis through 2 wk after weaning. Piglets with nipple drinkers wasted more water than the other piglets ($P < 0.001$; float, 295 ± 70 mL • pig-1 • d-1; nipple, 1,114 ± 63 mL • pig-1 • d-1; and push-lever, 186 ± 63 mL • pig-1 • d-1), whereas piglets with float bowls consumed less water than the other piglets ($P < 0.001$; float, 475 ± 81 mL • pig-1 • d-1; nipple, 870 ± 76 mL • pig-1 • d-1; push-lever, 774 ± 76 mL • pig-1 • d-1). Drinker type affected feeding behavior ($P = 0.02$); piglets with push-lever bowls spent less time at the feeder than the other piglets, although no difference was detected for feed intake ($P = 0.64$) or overall ADG ($P = 0.16$). Piglets with push-lever bowls also tended to perform less piglet-directed nosing behavior than piglets with the float bowl ($P = 0.04$).

Piglets appear to use more water during the first 2 d after weaning with certain drinker devices. However, piglets do not appear to attain satiety through water consumption because most of the water used during the first few days after weaning is wasted. This excessive drinking and water wastage can be abated

through the use of push-lever drinkers without negative implications for feed intake or growth rates.

Navel Bleeding

Source: May 28, 2008 PigSite.com

Loss of blood through the navel of the newborn pig can result in severe anaemia, failure to grow and, in the extreme, early death, writes Mark White BVSc DPM MRCVS in the NADIS Health Bulletin. The condition is usually sporadic, although it can occur in outbreaks and there may be a variety of causes. In the most severe outbreaks, 50 per cent mortality can occur. Clinical Signs: Following birth of the pig, a proportion of the blood volume will be left in the umbilical cord. This should constrict and "push" this blood into the body and the remaining blood immediately clots to prevent leakage. If this constriction does not occur fully – such as with the "black pudding" navel, or if relaxation recurs or if the blood fails to clot, loss of blood will occur.

On solid floor systems, blood will be evident in the pen and often over the bodies of other piglets 2-4 hours after birth. However, where a pen is fully or partially slatted, the blood may be less obvious, having dripped through the slats and all that will be seen is obvious pallor of the piglet. It is not uncommon for stockmen to believe that the piglets are actually born pale. This is rarely the case but can occur where farrowing is slow and stillbirth rates tend to be raised.

Causes: A range of possible causes have been recognised as the trigger factors for navel bleeding.

1 Failure to clot: This is likely to result from either prematurity or a failure of the normal clotting mechanism due to outside chemical insult eg sows that have had access to rat bait (Warfarin) or Aspirin. Aspirin (Acetyl Salicylic Acid) has been used historically to prevent premature farrowings in the face of a PRRS outbreak by oral application to the sow in the seven days prior to farrowing. Navel bleeding was not commonly seen and where it did occur it is difficult to know whether it was due to the medication or the viral challenge of PRRS to the piglets. Aspirin is not licensed for food producing animals within the EU and as such its use off licence would render the sow unfit for human consumption during treatment and for 28 days thereafter. The most common cause of navel bleeding in the UK is likely to be the result of resins present within certain hardwoods that are periodically and erratically included in wood based bedding materials (shavings or sawdust – the latter being more of a problem). It is unknown whether these resins act locally on the navel (most likely) or more generally throughout the body. There does not appear to be any association with the age of sow farrowing and the appearance of navel bleeding, and the condition is very rarely seen in outdoor farrowing systems. There are specific inherited clotting defects akin to haemophilia in humans but these tend to occur in pure breeds and are rare in

commercial pig production (e.g. Von Willebrand's Syndrome in the Poland China breed).

Some producers believe there is a link with Prostaglandin induction of farrowing and navel bleeding in piglets although it is unclear if this is a direct chemical effect or the result of premature farrowing.

2 Farrowing induction: Data sheets from prostaglandins warn against using the product to advance farrowing more than two days earlier than the herd average, for fear of increasing non-viable pig production but do not specifically mention navel bleeding in warnings. 3 Damage to the cord: Over enthusiastic breaking of the cord close to the pigs' belly at birth can damage the blood vessels and allow leakage of blood. When a cord is left to trail, it can be damaged by getting caught in slats or trodden on by the sow. In general, physical damage to the cord is more likely to produce individual pale pigs rather than affect whole litters.

Consequences: Navel bleeding can cause death, rising mortality levels by one to two per cent in longstanding problem herds or dramatic mortality in outbreaks. Partial anaemia can limit weaning weight by 2kg individually and expose the pig to a range of secondary diseases.

Control and Prevention: If navel bleeding is widespread on a litter basis:- Replace wood shavings/sawdust with chopped straw or paper. It is extremely rare to see outbreaks of navel bleeding or even long term grumbling problems on non-wood based bedding. Avoid inducing farrowing before the due date. Remove any possible sources of anticoagulant for sows (rat bait, aspirin). Inject sows with Vitamin K up to 24 hours prior to farrowing. (This is the usual treatment for Warfarin poisoning), (This is an unlicensed human medicine rendering a treated animal unfit for human consumption for twenty eight days after reatment). Feed Vitamin C (Ascorbic Acid) to sows in tablet form for 7 days prior to farrowing (Vitamin C is not stable in feed and can only practically be given in this way or more erratically via the water system). Dose rate is up to 5g per sow per day. Clamp navels at birth using proprietary human navel clamps, which can be re-used if cleaned and sterilised. They need to stay in place for 24 hours. Cut off trailing cord. This may create something of a dilemma; to be able to clamp cards, supervision of farrowing or early attendance is essential which can be best achieved by inducing farrowing with prostaglandin which may themselves risk premature farrowing and more navel bleeding. Alternatively, if a long cord is left, tie a simple overhand knot in it close to the belly and cut off trailing cord. Do not tear off cords close to the belly as the pig is born – it is better to allow the natural process to occur, or break the cord at least 15cm away from the piglet's belly. Iron injections. There is always a tendency to give pale pigs extra iron injection although great care is needed, as this may be toxic. A normal dose should be given within 72 hours of birth and no more than a normal dose should be given again 7-10 days later. Provision of electrolytes will be beneficial to help restore fluid volume in the first 24 hours of life.

Costs: In a severe outbreak on a 300 sow breeder feeder farm lasting for two weeks total losses due to bleeding were 160 piglets- over 50 per cent mortality equating to a cost of £5,600 (at £35/piglet covering all costs). A two per cent rise in mortality over a year in a similar herd due to low grade uncontrolled navel bleeding would equate to a similar level of loss and cost. If the problem occurs in association with induced farrowing then a careful cost/benefit analysis will be required to decide whether induction should continue.

Stillbirths in Pigs

The Pigsite
June 2, 2008
NADIS is a veterinary-based production disease monitoring and recording system covering England and Wales. Practising veterinarians provide day-by-day information of what is happening on pig farms that may have an impact on health and productivity. This paper by Mark White BVSc DPM MRCVS looks in detail at one of the most important limits on pig breeding herd production – that of pigs born dead.

Pigs that are born dead may have died at any time during the farrowing process or before. If they died in earlier pregnancy (up to 110 days gestation), there will be evidence of complete or partial mummification, whereby the fluid component of the foetus is reabsorbed, leaving just skin and bone. If the piglet dies in the few days prior to birth, it is likely to be swollen, slimy and may show early signs of decomposition.

However, studies have shown that in the “normal” herd, more than 90 per cent of stillborn piglets are alive at the start of farrowing and this incidence only changes in the face of infectious disease e.g. PRRS, parvovirus.

Incidence
In a normal indoor herd unaffected by specific disease, a target for stillborn pigs would be 7 per cent of the total number born. However, this target would assume a normal distribution of sow ages within the herd. There is a variable incidence of stillbirths with parity along the following lines:-

The reasons for this distribution are:-

1.. Gilts tend to produce smaller litters of bigger pigs, which are more likely to become obstructed and, therefore, die before birth. With a lower litter size, the percentage of stillbirths will be higher.

2.. In older sows, the farrowing process is prolonged. In effect the uterus acts like a child's balloon; each time it is inflated and deflated, it gradually loses its ability to return to its orignal shape. The tone in the muscle of the uterus in older sows is lost and so the farrowing process is slowed down.Therefore, when reviewing stillbirth levels, they must be looked at in the light of the herd age structure. Retention of too many old sows in the herd will contribute to raised stillbirth levels for the herd as well as producing more uneven piglet size at birth.

The economic effect of a raised stillborn level can be quite high; for a 300-sow herd running at 10 per cent stillbirths, this would represent a loss of 235 pigs per year above the 7 per cent intervention level. If each of these piglets was valued fully within a breeder-feeder enterprise, this represents a financial loss of over £9,000 per year.

It should also be borne in mind that some pigs recorded as born dead are actually alive at birth but are weak (possibly by a shortage of oxygen during farrowing) and never move away from the rear of the sow. Whilst the definition of death may be arguable, the causes and effects are the same. Stillborn pigs can be definitively identified best by the failure of lung sections to float in water.

Records of stillbirths in outdoor herds are generally low but this may be due as much to a failure to find them as it is to genuinely reduced incidence.

What causes stillbirth?
During gestation, the piglet is supplied with oxygen by direct transfer from the sows' blood to the piglets' across the placenta and this continues up until the point of delivery.

The stimulus for the piglet to breathe is the loss of this oxygen supply. If the piglet remains in the uterus, it will either suffocate or drown depending on how far down the birth canal it has reached. Therefore, premature separation of the placenta or early breaking of the umbilical cord will kill the piglet. The former is the most common problem and will result from either obstruction of the passage of the piglet or a failure of the uterus to contract and expel the pig. Rarely, the umbilical cord becomes entwined with the pig, cutting off the blood supply. (Strangulation is very rare.)

Slow Farrowing
As well as being strongly age-related, a number of factors can slow down farrowing by reducing the contraction of the uterus – under the control of oxytocin. In general, it can be said that in the second half of the farrowing process, if there is more than a 30-minute interval between delivery of pigs, stillbirths are likely to result. Farrowing can be slowed by:-

1.. High adrenaline levels e.g. in excitable gilts, noisy or disruptive handling.

2.. Heat stress
3.. Fat sows
4.. Emaciated sows
5.. Chronically stressed sows producing excess cortisone, which “weakens” muscle. Over-sized sows in cramped crates is a common problem with large modern sows.
6.. Specific dietary deficiency e.g. vitamin E.
7.. Lack of exercise in sows. There is a widely held belief that sows kept in confinement during gestation (stalls or tethers) produce higher stillbirth rates. BPEX/MLC records indicate that in 1992, when 50 per cent of sows would have been confined, the stillbirth average was 6.7 per cent of total births (MLC yearbook 1993) whereas in 2002 when all sows were kept confined in gestation, the stillbirths average was the same. (MLC yearbook 2003.)
8.. Sow illness and constipation at farrowing.

Where stillbirths are excessive, a full veterinary investigation is needed to highlight the contributory factors.

Control/Reduction

In addition to correcting any environmental problems (temperature and space provision), sow condition and nutrition problems, the key to reducing stillbirth rates is supervision of farrowing. If financial constraints prevent supervision, a higher level of pigs born dead – as well as a higher neonatal mortality – can be expected.

Supervision may be improved by induction of farrowing using prostaglandins (with or without oxytocin-like products) but once farrowing has started, the intervals between piglets’ deliveries should be recorded. As a general guide, a ‘normal’ farrowing would typically involve delivery of a few piglets followed by a ‘rest’ period of up to 90 minutes before starting again. However, any delay beyond 20-30 minutes since the last pig in the second half of farrowing is likely to lead to later born pigs arriving dead. Traditionally, small doses (2-3ml) of oxytocin can be given repeatedly to deliver each piglet where farrowing is slow.

A longer acting analogue (Reprocine : Vetoquinol) is now available and can be given as a single dose once farrowing has started, and will give waves of uterine contractions – accelerating farrowing – over a 6-hour period. The dose used is critical and should only be used as directed by the herd’s veterinarian. Before using either oxytocin or the long acting alternative, always ensure that there is no obstruction in the birth canal.

Once delivered, early and appropriate action may be needed to clear the airways of fluid and allow unassisted respiration.

As a final comment, the traditional feeding of soaked bran to the sow in the 48 hours prior to farrowing can help to speed up farrowing, thus reducing stillbirths as well as helping milk production. The pratcie is particularly relevant for herds in

which sows are removed from straw-based dry sow accommodation into fully slatted or unbedded farrowing pens. Alternatively, proprietary sow supplements (e.g. ParturAid : SCA) may assist speeding up farrowing.

Eating Behaviour in Large Groups: Learning How Pigs Perceive Their Environment

Source: June 20, 2008 The PigSite.com

Harold. W. Gonyou from the Prairie Swine Centre looks at the eating habits of pigs in large groups in pens and how they adapt to their environment.

As we studied how finisher pigs perform in large groups we have also studied their eating behaviour. Our reasons for this extend beyond our interest in feed intake, to questions we have on how pigs perceive their environment and the impact that could have on our management. For example, when we first started working with larger groups, in this case 80 pigs in a pen, two theories existed for how pigs interacted with this large space. One theory was that to avoid unfamiliar pigs and aggression, the animals would restrict their movement to a limited area of the pen. We would call this a territory. We used 8 feeders in the pen of 80 pigs, and spaced these evenly along one of the long walls of the rectangular pen. Of 60 pigs that we observed, 80% visited all 8 of the feeders during a 24-hr period. All of the pigs ate from at least 6 of the feeders. This eating behaviour demonstrated that the pigs were not territorial, but used the entire pen. The implication was that resources, such as feed and water, did not have to be located throughout the pen, but could be concentrated, perhaps in a food-court. We continued our studies with slightly larger groups (108 pigs/pen) but retained the spacing of feeders equidistantly along the length of the pen.

The eating behaviour of pigs in large and small (18 pigs/pen) groups was remarkably similar with the exception of the first week after group formation. While pigs in large and small groups spent similar amounts of time eating during the first week, those in large groups visited feeders more often (35 times/day) than did those in small groups (25 times/day). As with the pigs in the previous study, the pigs in large groups were sampling many feeders each day. The first week after the groups were formed we saw both a reduction in average daily gain and an increase in feeder visits (but not total eating time) in large groups compared to small. We hypothesize that the need to investigate the entire pen during the first days in a large group led to many feeder visits, and contributed to a reduction in growth.

Moving on from our finding in the first study that pigs would use the entire pen, our next experimental set-up placed the feeders in the large group together near one end of the pen. Unlike the previous studies, pigs in the large group would

have to travel farther from their lying area to the feeder than did the pigs in small groups. The eating behaviour of pigs in large groups changed. When the cost (effort) to get to a resource (feeder) increases, we would predict that animals would visit the resource less often, but the visits would be longer to compensate. This is what we saw in large groups. The pigs in large groups ate fewer (9.2 vs 11.7 meals/day) but longer meals (7.4 vs 5.3 min/meal), so that the total time spent eating in a day (60.4 vs 55.7 min/day) and total feed intake (2.78 vs 2.82 kg/day) were similar in large and small groups. In this same study we superimposed a crowded treatment (k = 0.025) on the group sizes. Crowded pigs also reduced the number of visits to the feeder each day, but they did not increase the length of their visits or maintain their total eating time and feed intake.

The crowded pigs demonstrated a loss of appetite compared to the pigs in large groups, even though both conditions resulted in fewer meals. Our studies on eating behaviour of pigs in large groups have demonstrated that pigs make use of the entire pen, visiting most if not all feeders regularly. The inquisitiveness leading to this extensive use of the pen is evident in a large number of feeder visits during the first week, and may contribute to poor initial growth in the system. When feeders are concentrated in one area of the pen, making it more difficult to get to a feeder, pigs in large groups reduce their number of meals, but compensate by having longer meals. The adaptability of pigs in large groups allows us to broaden the scope of our management options to include not only large groups, but also concentrated feeding areas within the pen.

Increasing Daily Feeding Occasions in Restricted Feeding Strategies Does Not Improve Performance or Well Being of Fattening Pigs

By Eva Persson, Margret Wülbers-Mindermann, Charlotte Berg and Bo Algers. Published by BioMed Central in the Acta Veterinaria Scandinavica 2008, 50:24 Journal.

Abstract

Background

The natural feeding behaviour of the pig is searching for feed by rooting activities throughout the day; self-feeding pigs randomly space their eating and drinking periods throughout the day consuming ten to twelve meals per day. Pigs in conventional fattening pig production are normally fed 2-3 times daily with the feed consumed within 15 minutes. The aim of this study was to determine if more frequent feedings could improve the performance of conventionally kept fattening pigs.

Methods

The experiment was carried out on 360 fattening pigs (27-112 kg live weight), weighed and assigned to pens stratified by weight and sex. Each treatment

group consisted of 180 pigs, allocated to 20 pens with nine pigs in each pen. To evaluate how more feeding occasions affects performance and well-being the pigs were divided into two groups and fed three (control group) or nine (treatment group) times daily. The same total amount of liquid feed was fed to each group and the feed ration was correlated to the live weight of the pigs. All weight and slaughter recordings were made individually and recordings of feed consumption were made pen-wise. At slaughter the stomach of each pig was examined for lesions in the pars oesophagea and scored on a scale from 1-6.

Results
Frequent feeding occasions influenced both performance and status of gastric lesions of the pigs adversely. Pigs in the treatment group grew slower compared to pigs in the control group; 697 g/day (± 6.76) versus 804 g/day (± 6.78) ($P<0.001$) with no difference in withinpen variation. There was also a lower prevalence of gastric lesions within pigs in the control group (2.4 (± 0.12) compared to 3.0 (± 0.12) ($P<0.01$)). There was a positive correlation between gastric lesions in the treatment group and daily weight gain ($r=0.19$; $P<0.01$).

Conclusion
Increased daily feeding occasions among group housed pigs resulted in a poorer daily weight gain and increased mean gastric lesion score as compared with pigs fed three times daily. This may be a consequence of more frequently occurring competition for feed in the treatment group. The present study does not support increased daily feeding occasions in fattening pigs.

Organic pigs breed more bad bugs

24 June 2008
From issue 2661 of New Scientist magazine,
24 June 2008, page 6

Animals reared in natural, outdoor conditions without nasty modern drugs yield healthier meat, right? Not necessarily. Wondwossen Gebreyes and colleagues at Ohio State University in Columbus tested US pigs for antibodies - telltale signs of infection - to pathogens that can also affect humans. They found traces of Salmonella in 39 per cent of pigs raised in standard indoor pens and routinely given antibiotics, but in 54 per cent of organic pigs raised outdoors without the drugs (Foodborne Pathogens and Disease, vol 5, p 199).

This poses a dilemma, says Gebreyes: giving pigs routine antibiotics favours antibiotic-resistant bacteria, but not giving them drugs means more animals carry Salmonella, which causes a million cases of food poisoning a year in the US alone.

They also found traces of the parasite Toxoplasma, carried by cats and other animals, in 1 per cent of conventional pigs but 7 per cent of free-range animals. The parasite can damage developing fetuses.

Worse, the US team found two organic pigs with signs of infection with Trichinella, a roundworm that can cause chronic disease and even kill when people eat undercooked pork. Trichinella is nearly eradicated in livestock in the the US and Europe, though it persists in wildlife. Finding it in two pigs of the 600 tested is 23 times its average frequency in US pigs.

"Does having an antibiotic-free and animal-friendly environment cause the re-emergence of historically significant pathogens?" Gebreyes asks. "That is an extremely important question for consumers, policy-makers and researchers."

Balancing Sow and Piglet Welfare with Production Efficiency

Author: Summarized by Penny Lawlis - Animal Care Specialist/OMAFRA
Creation Date: 30 May 2008
Presented by: Sandra Edwards, Newcastle University, United Kingdom

The Current Status of Sow Welfare Legislation in the EU
The first restrictions on sow housing systems in the EU were written in Directive91/630/EEC, which required the phasing out of tether systems by 2006.

Stall systems for gestating sows, while still permitted under this 1991 Directive, were acknowledged to pose a number of challenges to sow welfare and were made a key subject in a detailed review of pig welfare by an EU expert working group (Scientific Veterinary Committee, 1997). As a result of the conclusions from this review, further restrictions were introduced in amendment to the Directive in 2001 (Directive 2001/88/EC) which requires the phasing out of gestation stalls (except for the first four weeks of pregnancy) by 2013. Several countries (including Norway, Sweden, Switzerland and UK) have unilaterally implemented a ban on all individual confinement systems for dry sows before this date. The target of animal welfare pressure groups is now the farrowing crate. The 2001 Directive amendment specifically requested a scientific review of this subject which has recently been delivered (EFSA, 2007).

The Welfare Issues for the Farrowing Sow

For the farrowing sow, the most significant welfare issues associated with confinement result from the frustration of strongly motivated behaviours by a restrictive environment. Under natural conditions, the sow seeks a nest site and then builds a nest shortly prior to farrowing in order to provide an appropriate environment to maximize survival of her newborn piglets. The original reasons for the adoption of the farrowing crate were to reduce mortality of neonatal piglets by the control of sow movements which might cause crushing, and by the ability to

increase the environmental temperature controls and human inputs at a time when these interventions can significantly enhance survival. It is the potential for conflict between the welfare needs of the sow and her piglets which has made the issue of the farrowing crates so problematic.

The Non-Confinement Alternatives for Farrowing and Lactating Sows

Relatively few non-confinement alternatives for farrowing and lactating sows have been subject to large scale commercial evaluation. The alternatives can be categorized into three general types:

Individual Housing with Reduced Sow Confinement
Group Farrowing Systems
Two Stage Systems
Welfare Challenges

Although designed to give welfare improvements in comparison with the farrowing crate, many of the non-confinement systems still pose some degree of welfare challenge for the sow. In individual pen designs with minimal space, hygiene requirements dictate the use of fully slatted floors and preclude the use of bedding. True expression of nest-building motivation is therefore not possible. The larger individual pen systems fail to allow enough space for the sow to express the increased locomotion seen in the phase of nest site location.

Economic Challenges

For most of the alternative lactation systems, capital cost will be increased because of greater space requirement. The exceptions can be the simple group systems outdoors in paddocks or in bedded yards, where costs for building structures can be low in areas where conditions are suitable for such housing.

After many disappointing attempts, however, it does finally appear that non-crate systems might have the potential to deliver acceptable levels of survival under commercial conditions. More recent large scale studies in Switzerland, Australia and Denmark have given comparable total survival in crate and pen systems, with greater crushings in pen systems being offset by higher losses from other causes in crate systems. However, the absolute levels of mortality in these studies still tend to be at the higher end of current commercial norms and further development and evaluation are required before widespread commercial adoption could be recommended.

The Way Forward

Certain genotypes of sow are better adapted to extensive systems than others. This is particularly apparent in outdoor systems, but can also be relevant in indoor group-housing systems. Selection of genotypes for traits more relevant to

social and maternal success in non-confinement systems will be a critical part of a successful strategy.

POULTRY

Linking amino acids and trace minerals to feathers in layers

World Poultry
21 APR 2008

Recently completed research* funded by the US Poultry & Egg Association studied the effects of dietary sulfur amino acids and trace minerals on feather cover in laying hens.

* Effects of Dietary Sulfur Amino Acids and Trace Minerals on Feather Cover in Laying Hens, by Sheila E. Scheideler, Ph.D., Department of Animal Science, University of Nebraska, Lincoln, NE 68583-0908

Importance of the study
Feather cover is important for its insulation value and protection from scratches and injury to the hen's skin. In commercial settings, surveys indicate a rapid deterioration in feather cover after the hens are about 40 weeks of age, with some recovery after molt and then again a rapid deterioration during the second cycle of egg production. The United Egg Producers Animal Husbandry Guidelines also note the importance of adequate feather cover for the welfare of the laying hen.

Objectives
The objectives of the research were to test the level of cystine and methionine supplementation necessary to optimise feather cover during the first and second cycles of egg production, and to investigate the effects of supplemental selenium (Se) or zinc (Zn) on feather cover through the first and second cycles of egg production.

Results
Egg production (EP) was significantly affected by dietary amino acid treatment during all three phases of production. During Phase 1, EP was greatest for hens on the control diet (low methionine and basal cystine) or high cystine diets. During Phase 2, EP was greatest for hens fed the highest level of methionine supplementation. There was no benefit to cystine supplementation during Phase 2. During Phase 3, positive effects of high levels of methionine or cystine supplementation were quite apparent for improved egg production. Trace mineral supplementation had a transitory effect on egg production during Phase 2 of the study, showing improved EP when hens were fed inorganic Se combined with 100 ppm Zn from Bioplex.Egg weights were only significantly affected during

Phase 2, at which time hens fed the highest level of methionine had the greatest egg weights. Cystine and methinionine supplementation inconsistently improved egg weights during Phase 3 whereas trace mineral supplementation had no effects on egg weight.

Feather scores by both feather quality scales (Webster and Hurnik‘s for overall or Tauson’s for five different areas of the body) did not show any dietary amino acid or trace mineral treatment effects. Age significantly affected feather scores as one might expect. After 46 weeks of age, feather scores significantly decreased by both scales, reaching a low point by 64 weeks of age. Feather scores significantly rebounded following the molt but were not positively influenced by the dietary treatments.

Conclusion
High levels of methionine or cystine supplementation had positive effects on egg production and egg size. Cystine was as effective as methionine at the highest treatment levels. Unfortunately, the levels of methionine and cystine supplementation used in this trial were not able to prevent normal age-related feather loss in this population of white leghorn hens. The practice of non-restriction molting did improve feather quality and scores for a period of time following the molt regime.

University Receives Grant to Reduce Feather Pecking

Wednesday, June 25, 2008
ThePoultrySite News Desk

UK - Bristol University's Animal Behaviour and Welfare Group has been awarded £850,000 to find ways to reduce feather pecking and in free-range layers.

Laying hens often severely peck other hens' feathers, skin or vents. This not only causes pain but can also lead to cannibalism and death. Harmful pecking is a serious animal welfare concern and can cause great economic losses for the farmer and the egg-production industry as a whole.

Researchers Dr Chris Sherwin, Professor Christine Nicol and Dr David Main at the University of Bristol's Animal Behaviour and Welfare Group have been awarded over £850,000 over three years by the Tubney Charitable Trust to reduce harmful pecking by using existing knowledge to improve the welfare of free-range laying hens.

There is already considerable scientific and industry-based information on harmful pecking but it has never been pulled together as a single resource for the egg production industry.

Using scientific information, expert opinion, detailed advice from the industry, and taking financial implications into consideration, the researchers hope to develop a practical, cost-effective husbandry advisory pack with the aim of preventing harmful pecking amongst free-range laying hens.

"Harmful pecking is both a serious welfare concern and an issue of great economic significance."
Dr Chris Sherwin

The advisory pack will make the information accessible to egg farmers and their advisors, and will identify the most appropriate husbandry solution for each individual farm. The researchers will develop the pack to enable individual farms to recognise and reduce risk factors of harmful pecking, recognise and distinguish between different forms of harmful pecking, and promote the farmer's ability to reduce pecking by following recommendations.

The intervention strategies contained in the pack will be evaluated on numerous recruited farms, and feedback from farmers and field-assistants will be used to develop the usefulness of the pack over a three-year period. Flagship farms around the country will be signed-up as demonstration units allowing visits by other farmers, retailers, scientists and policy makers to observe the advisory pack 'in action'.

Dr Chris Sherwin, Senior Research Fellow in Animal Behaviour and Welfare, Farm Animal Science at Bristol University, said, "Harmful pecking causes stress, injuries, increased vulnerability to disease, and when feathers are removed by pecking, the pecked hens compensate for the reduced insulation by eating more food. When harmful pecking causes death, this obviously leads to an immediate end of egg production. Harmful pecking is therefore both a serious animal welfare concern and an issue of great economic significance."

Work on the advisory packs will proceed in three phases. Initially, the researchers will conduct a review of current literature and other information to translate this into a workable advisory pack.

The researchers will then implement the package on a range of farms, monitor its effectiveness and feed back into the package information collected during numerous farm visits and farmer reports. A third phase, which is not funded, will be an industry-wide roll-out of the advisory pack with the most effective strategies promoted to the industry.

There are 30 million laying hens in the UK flock and an extensive survey conducted previously by the Behaviour and Welfare Research Group has revealed that 55 per cent of flocks are affected by harmful pecking. This indicates that each year, several million hens are suffering from this welfare problem.

The motivation to reduce harmful pecking and improve the welfare of laying hens is great, originating from consumers, farmers, retailers, welfare organisations, assurance schemes, scientists and legislators alike. Although there might be different reasons underlying this motivation, all these stakeholders wish to see a decrease in harmful pecking.

Automated Measurement of Foot Pad Lesions

By Welfare Quality®, Science and Society Improving Animal Welfare. This article was published in Update8 e-zine. The scoring of foot pad lesions in broiler chickens is one of the parameters of the broiler welfare assessment system that is currently being developed in Welfare Quality®.

April 2008

Moreover, it is likely that foot pad lesions will be included as a welfare parameter in the European Council Directive for the protection of broilers in the near future. This means that an animal based parameter will be referred to in legislation, whereas until now housing related parameters are almost exclusively used. Scoring animal based parameters routinely is not easy. Thus far, foot pad lesions are measured at the slaughter plant by trained veterinarians. To automate this, video imaging might be useful. This technique is currently used to monitor aspects of carcass classification at the slaughter plant, like bruises and breast blisters.

The Animal Sciences Group of Wageningen UR, Meyn Food Processing Technology BV and the Flandrex slaughter plant started a project with the objective to develop a prototype of an automated system to measure foot pad lesions in broilers at the slaughter plant. The existing video imaging system was quickly found to be unsuitable for measuring foot pad lesions. Therefore, a new camera system was developed and the best position identified: after removal of the feet just before the feet are automatically de-shackled. A prototype was installed in-line and images were made from 51 flocks. From each flock, 100 feet were selected and scored by a trained researcher according to the Swedish scoring method (score 0: intact foot pads; score 1:moderate lesions; score 2: severe lesions).

From these 51 flocks the prototype system photographed 95.8% of the foot pads. Missing images were caused by empty shackles, a wrong position in the shackle or feathers on the foot pads. The percentage of agreement with our scoring was 85.6% for score 0, 16.7% for score 1 and 77.8% for score 2.

It can be concluded that the prototype was successful with respect to the percentage of foot pads that can be photographed and scored. However, the

software needs further improvement as it fails in scoring foot pads with moderate lesions. The camera system and upgraded software will be used in a new implementation task: foot pad lesions will be automatically scored in 120 flocks from 40 broiler farms (per country) in the Netherlands, Italy and the United Kingdom.

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Preventing Lameness in Broiler Chickens

The PoultrySite
June 2, 2008

This research was executed within the third sub-project of Welfare Quality®, which focuses on the development of practical strategies to improve farm animal welfare.

Animal welfare is a complex concept but there is general agreement within the scientific community and beyond that our farm animals should be able to move easily and be maintained in good health, as described in the Welfare Quality® fact sheet ‘Principles and criteria of good animal welfare’.

Lameness in broiler chickens is one of the issues being tackled in the European Union-funded Welfare Quality research project designed to integrate farm animal welfare into the food chain by developing reliable on-farm welfare assessment systems and practical strategies to improve farm animal welfare.

According to researchers participating in this project, farmers often significantly underestimate the scale of lameness in their broiler flocks and in doing so, they risk reducing the birds’ welfare as well as product quality and profitability.

Between 10% and 30% of the birds in European broiler flocks may suffer from painful leg disorders caused by bone and joint infections as well as skeletal abnormalities, which have been linked to fast growth during the first few weeks of life. Encouragingly though, Welfare Quality researchers have discovered how a different diet and feeding regime can significantly reduce lameness and thereby improve animal welfare.

A new kind of diet

Welfare Quality scientists have shown that lameness in broilers can be reduced by slowing down the birds' rate of growth during the first few weeks and then speeding it up once their bones have developed.

By using a new combination of two diets and a sequential feeding method, the researchers discovered that they could slow growth during a chick's early stages without reducing final carcass weight.

The researchers recommend a 48-hour feeding cycle with two diets instead of the traditional continuous distribution of a single diet.

For the first seven days of life, broiler chicks should be fed a standard starter diet. Then, from day 8 to day 28, the diets should rotate every 48 hours between a low-energy, high-protein (E-P+) diet and a high-energy, low-protein (E+P-) diet. That makes for a total of 10 cycles of E-P+ and E+P-.

The birds should then be given a standard finishing diet from day 29 onwards. This novel regime not only reduced instances of lameness but also brought the broilers up to standard slaughter weight without the need for any additional feeding days.

An E-P+ diet contained 97 per cent of the energy and 121 per cent of the protein of a standard diet. For the E+P- part of the feed cycle, the diet comprised 103 per cent of the energy of a standard one with 79 per cent of the protein.

Is this new method more expensive?
Welfare Quality researchers are still analysing the price differences between the feeding programmes but initial results suggest that the sequential one is not more expensive than the standard one. The cost of the sequential programme becomes even lower when protein-rich feed ingredients like rapeseed and dried distillers grains with solubles (DDGS)- by-products from the biofuel production - are cheap because they can be used effectively to replace other more expensive dietary components in the E-P+ part of the cycle.

A win-win situation
The sequential feeding method developed by the Welfare Quality researchers could be a win-win situation for the chickens and the farmers; it could improve bird welfare by reducing lameness at no extra cost while safeguarding the farmers' profits.

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Leg Health in Large Broilers

Leg health is one of the most prevalent causes of culling and late mortality during grow-out of heavy broilers according to Edgar O. Oviedo-Rondón, DVM, PhD., Dip. ACPV Department of Poultry Science North Carolina State University.
May 2008

Introduction

Leg health is one of the most prevalent causes of culling and late mortality during grow-out of heavy broilers. Leg problems are also sporadically observed during the first weeks of life causing increments in early culling as well. Leg issues have a major impact on welfare audits. The incidence of clinical lameness or leg disorders is typically less than 2 or 3%. However, many more broilers are subclinically affected presenting changes in gait patterns, reduced walking ability with detrimental effects for feed conversion and growth.

Even though, these leg problems seem to have a low incidence, they are very prevalent and all flocks have at least one percent of birds with some type of leg problems. The live production losses are just a small part of the economical impact of leg problems. Current statistics suggest that the downgrades and carcass trims associated with broilers that have leg problems increase costs per kilo of live weight. Lame birds spent much more time lying in the litter and bring more contamination to the processing plant increasing problems of food safety. Lame broilers have more condemnations like breast blisters, scratches and inflammatory processes (IP). Vaillancourt and Martinez (2002) reported a correlation between IP and angular leg deformities. Some of the skeletal deformities affect the operation of automatic evisceration and deboning equipment, thus impacting processing line speeds, the requirement of manual trimming and meat losses. Additionally, bone fragility affects the color quality of the deboned products and bone fragments represent a physical hazard. These facts indicate that improving leg health in broilers may bring several economical benefits to a broiler operation beyond addressing the welfare issues.

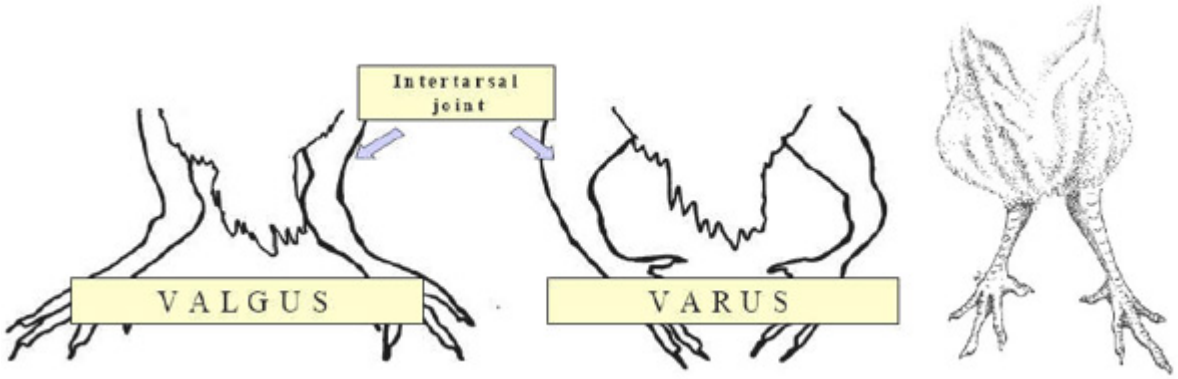
The incidence of each specific leg problem varies among farms and companies, and it is important to identify the specific problem(s) to program adequate strategies to reduce the incidence of these costly issues. The objectives of this presentation are to present some of the most common leg problems, the score methods used to measure their incidence, and to discuss some of the causes of leg disorders and the strategies to reduce their incidence at farm level.

Common leg problems observed in heavy broilers

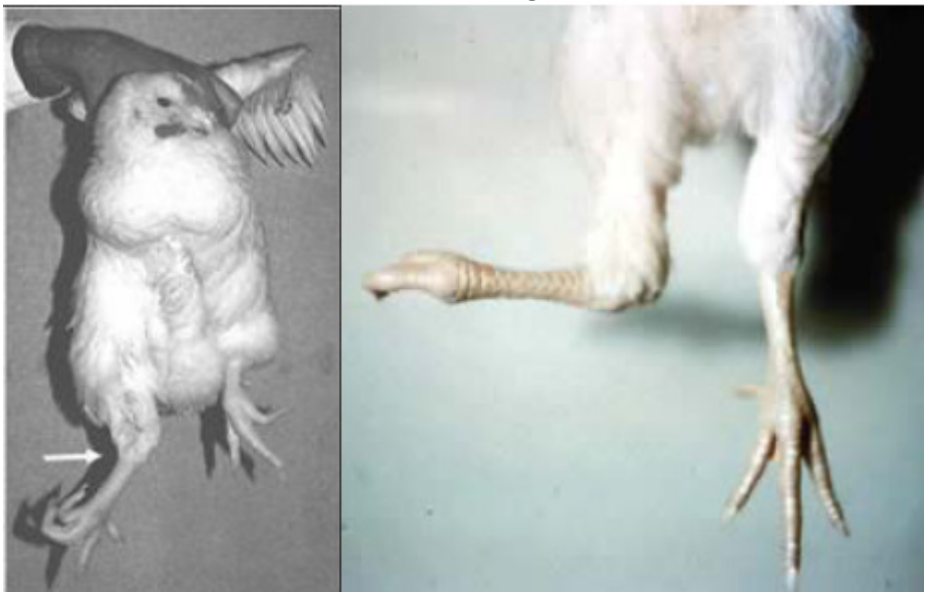
Bone disorders are not the only factor involved in leg health. Tendons, ligaments, articulations and nerves can also be affected and it is more difficult to find solutions to problems caused by these components of the skeletal system. Valgus (VVD), crooked toes, tibial dyschondroplasia (TD), vertebral deformities, twisted legs, osteoporosis of the proximal femur, and femoral head necrosis are the most common skeletal pathologies causing leg problems. Additionally, leg problems and changes in locomotion are also increased when footpad dermatitis and hock burns are observed. Currently, it is rare to observe slipped tendons, or

ruptured gastrocnemius associated with either viral arthritis or *Staphylococcus* as etiologies of leg problems in commercial flocks. In contrast, it is common to hear that vaccinations may help with leg problems without any clear reason.

Valgus and Varus deviations of tibiotarsi (VVD)



Twisted legs



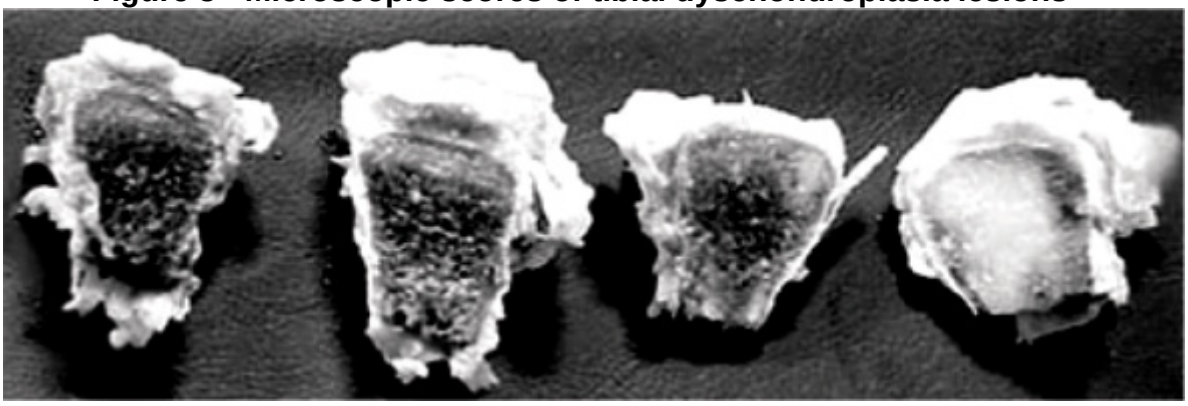
Some of these leg problems may be independent, while others are correlated. For example, VVD and vertebral deformities may be linked. Droual et al. (1991) reported an association between scoliosis and angular change in the tibiotarsi. Though a cause and effect was not proven, Droual's work suggests that an angular leg deformity could predispose to a vertebral deformity.

Tibial Dyschondroplasia (TD) in proximal epiphyses of tibias

This is one of most common bone developmental problems. TD causes articulation pain and changes in broiler gait patterns. TD can also cause deformations of tibias with more noticeable changes in angulations of legs. TD should be differentiated from rickets. It is normally reported in broilers older than 35 days of age. TD has many different pathophysiologic mechanisms; however

the late rapid growth rate may be one of the main causes under commercial conditions.

Figure 3 - Microscopic scores of tibial dyschondroplasia lesions



These leg or bone problems can be evaluated by either observation of broiler body posture or by necropsy. The evaluation of walking ability is evaluated by gait scores. At this moment there are two main systems of gait scoring: the Kestin system (Kestin *et al.*, 1992) and the US System under approbation by the American Association of Avian Pathologist (AAAP).

Management causes of leg problems in broiler flocks

Leg problems and developmental disorders of long bones can be affected by genetics, breeder nutrition, incubation, infectious diseases, and environmental stressors caused through the life of the broiler (Bradshaw *et al.*, 2002; Oviedo-Rondón *et al.*, 2006 a, b).

Breeder nutrition, incubation and chick transportation

Our results of more than 12 experiments at NC State University indicated that maternal nutrition and incubation conditions may affect leg health. Adequate warm pre-incubation with good air flow while avoiding low early cool incubation conditions are critical for proper bone development, reduced relative asymmetry between both legs, and decreased incidence of crooked toes and twisted legs. Hot temperatures and hypoxia during late incubation (last four days) reduced bone development and increased relative asymmetry of long bones. We also observed the beneficial effects of improved incubation on the incidence of leg problems under commercial conditions in large trial in collaboration with an integrator company in North Carolina.

The appropriate transportation conditions from hatchery to farm are also important to avoid leg problems. We evaluated effects of embryonic incubation temperatures and posthatch transportation stress on long bone development at hatch and leg health of broilers at 41 days of age. A total of 5,200 Cobb 500 fertile eggs were incubated so as to achieve an egg shell temperature of 36.7°Cm 98.1 oF (L), or a standard egg shell temperature of 37.5°C, 99.5 oF (S) during the first week of incubation. During the third week of incubation the eggs were incubated so as to achieve the S egg shell temperature or an egg shell temperature of 39°C, 102.2 oF (H). All eggs were incubated at S during days 8

to17, with combinations of the other temperatures occurring on day 1 to 7 and day 18 to 21 days to generate four incubation treatments: SS, SH, LS, and LH. At 41 days of age (Table 1), males had more (P<0.001) leg problems than females. Late hot temperatures and hot transportation conditions (T2) increased (P<0.01) incidence of crooked toes and percentage of chickens with gait score 2 and 4, respectively. Bad transportation conditions (T2) caused higher incidence of twisted legs (P<0.05). We concluded that low early and hot late incubation temperatures, and stress during transportation may affect early development of long bones and increase the incidence of leg problems.

Table 1. Effect of early and late incubation and chick transportation conditions from hatchery to farm on leg problems

Treatments		Crooked toes (%)	Twisted legs (%)	Gait scores at 41 days of age[1]				
				0	1	2	3	4
Incubation								
Early	L	9.38[b]	1.34	11.75	74.06	12.72	1.09	0.39
	S	13.63[a]	2.02	7.11	78.90	11.27	1.89	0.68
Late	H	13.33	1.60	9.47	73.59	14.59[a]	1.56	0.78
	S	9.68	1.77	9.39	79.36	9.40[b]	1.42	0.28
Transportation								
1		10.36	1.05[b]	9.35	76.57	12.89	1.08	0.11[b]
2		12.65	2.33[a]	9.51	76.38	11.10	1.90	0.96[a]
Probability								
Early incubation		0.043	0.543	0.147	0.093	0.622	0.581	0.537
Late incubation		0.251	0.735	0.842	0.088	0.023	0.751	0.229
Chick transport		0.849	0.037	0.513	0.721	0.603	0.565	0.032

[1]Score 0=normal gait pattern for heavy broiler; 1=mild limping until 5=complete immobility.

Early growth and brooding management

Skeletal defects such as varus/valgus deformities and kinky back (spondylolisthesis) are exacerbated when a producer cannot either control early growth rates or create conditions that derivate in very uneven flock early in life. These conditions are uneven brooding temperatures in the house, excessive cold or hot litter temperatures, cold draught, not enough feed space or water availability, or not enough light. Any of these uncomfortable conditions for broilers during brooding reduce their early feed intake and physical activity and both affect leg bones, muscles and tendon development.

It is important that broilers reach at 7 days of age body weights that are four times their initial body weight. This means that the average body weight should be between 160 – 180 grams (average 0.37 lbs) at the end of the first week. Flock uniformity can be measured by the coefficient of variance (CV %) of the population obtained with data of individual body weights. This value should not be higher than 10% during the first week of life. However, it is not unusual to observe flocks with average body weights lower than 145 grams, or several individuals in the flock with 100 grams or less and 200 grams or more. Under these circumstances, the CV is 14% or higher. In this type of uneven flocks with

individuals that have rapid early growth is common to observe leg problems later on in life.

Lighting programs

Lighting programs are the most common management methodology to reduce early growth. The lighting programs are very variable among companies and even among growers. Most of lighting programs with some hours of darkness (4 to 9 hours) and dimmed lights (less that 0.5 foot candle) during the daily light period, after the first week of age can effectively slow early growth rate, while improving feed conversion. In some cases, lighting programs also minimize cardiovascular and metabolic diseases such ascites, and the incidence of some skeletal anomalies such as tibial dyschondroplasia. However, lighting programs may be predisposing flocks to enteric disease and malapsorption by encouraging litter foraging (Schwean-Lardner et al., 2006a, b). Enteric diseases, “flushing syndrome” or feed passage syndrome are common between 12 and 28 days of age in commercial broiler flocks. These gut health problems are concomitant with changes in lighting intensity, long darkness periods, and changes in feed types from starter to grower. Malabsorption during early rapid growth induces rickets or osteoporosis of proximal femur, and VVD. In this case, it is not the diet per se, but the amount and balance of nutrients truly absorbed at the intestinal level the one that increases bone disorders.

Lighting programs are normally designed to reduce growth rates between the second week of life and two weeks prior to processing. These programs diminish bird activity during most of the day and reduce its maximum voluntary feed consumption, while improving feed conversion. During the last two weeks prior to processing, the light is increased to stimulate feed intake and consequently growth. However, this rapid growth compound with the previous lack of exercise or physical activity causes leg issues such as TD and VVD, as well as compensatory increase in longitudinal growth of leg bones that may not be symmetric in both legs. This asymmetry in the legs may affect gait patterns and impact the performance of some of the heaviest broilers in the flock.

Management strategies to reduce leg problem incidence

Good management practices to guarantee the uniformity of optimum temperatures according to the age of the embryo, and good ventilation within the incubators and hatchers may help to reduce leg problems in the field. Optimum brooding temperatures, good air quality, enough feeder and drinker space and light with intensities higher than 2 foot candles during the first week of life will improve early growth and bone development. All the practices used to avoid enteritis like proper management of feed, maintaining clean feed bins, feed lines, pans and water lines are necessary to avoid bone developmental problems. If the current lighting program is not reducing the incidence of leg problems, and litter foraging is observed, the program should be revised and allow more time for exercise and promote use of feed pans.

Water additives
Supplementation of vitamins to broiler drinking water is common in the industry. However, the experimental results on the benefits of supplementing vitamins in the water in addition to the ones supplemented in the feed to prevent leg disorders and cartilage problems in broilers are highly variable. Results of several experiments were reviewed by Oviedo-Rondón et al. (2006b). This high variability in the response to vitamin supplementation could be due to the genetic variability of the broiler genetic strains used and the degree of stress of those chickens during the experiments. Vitamin supplementation in the drinking water may help during the recovery period after situations of enteric disease and malabsorption.

Vitamin D and C are two of the main vitamins that can be added in drinking water with clear impact on leg health and bone development. These two vitamins even work together in bone metabolism. The level of vitamin D^3 used by the commercial industry in the United States is commonly 9 times higher than the NRC (1994) recommendations for broilers. Thus, it is very rare to observe any possible deficiency of vitamin D under commercial conditions unless there are mixing problems, mistakes in adding the vitamin to the feed or enteric disease.

Vitamin C is also added in the water of broilers for stress situations. The beneficial effects of vitamin C supplementation have been clearly linked to modulation of glucocorticords such as corticosterone under heat stress conditions and many other stressors. Some benefit on reducing TD was observed when vitamin C was supplemented to diets with very low Vitamin D, only 2 µg/kg of 1,25-$(OH)^2D^3$. Using even higher levels of Vitamin C (250, 500 or 1,000 mg/Kg of diet) in diets devoid or with only small amounts of Vitamin D, (10 µg/kg of 1,25-$(OH)^2D^3$) did not improve TD even under low-Calcium and highphosphorus diets.

Water soluble vitamin deficiencies play important roles in skeletal disorders. Although a common commercial corn-soybean meal diet may contain enough of these vitamins, it has been proven that they are not sufficiently bioavailable for bone development of fast growing chickens. Sufficient vitamin fortification of diets with synthetic sources is necessary and commonly done in the industry. However, the vitamin premixes included in diets are commonly not formulated to supply the minimum NRC (1994) recommended levels for thiamine, pyridoxine and biotin according to an industry survey done by BASF in 1998. Marginal pyridoxine (vitamin B^6) deficiencies are involved in hyperhomocysteinemia and reduced activity of lysyl oxidase fundamental for elastin and collagen cross linking. Several research reports suggest that the high blood levels of homocysteine, and low levels of folate, vitamins B^6 and B^{12} affect bone metabolism, increasing TD incidence, reducing bone structure, quality and increasing fracture risk in chickens and humans. Deficient biotin dietary levels are associated with pododermatitis in broilers.

In conclusion, supplementation of vitamins in drinking water of broilers may help under stressful conditions and enteric diseases, but extra vitamins are not an adequate treatment or prevention measurement of leg problems.

Vaccines?

Viral arthritis/tenosynovitis caused by reovirus and *Staphylococcus spp.* infections can cause leg problems. Staphylococcus infection can be prevented with proper house sanitation between flocks, minimizing human manipulation of birds, and keeping healthy birds. Reovirus infection caused viral arthritis or tenosynovitis (Rosenberger, 2003). Reovirus infections are additionally prevented with vaccines applied directly to broiler breeders. However, it has become more common to observe vaccination in commercial broiler with reovirus strains that cause tendon problems. The following signs are characteristic of viral arthritis: 1) Swelling and inflammation of digital flexor and metatarsal extensor tendon sheaths; 2) Foot pad swelling; 3) Ulceration of articular cartilages; 4) Haemorrhage in tissues around the articulation (green leg disease) and 5) Fibrosis in chronic cases. If you do not observe these signs in your flocks and do not have confirmation or reovirus infection, you may not need to use these vaccines. Live virus vaccines, like the ones used to prevent viral arthritis, always cause an immunological reaction that reduces broiler growth and affect feed conversion.

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How to Gauge Optimum Timing for Pulling Day-Old Chicks

The PoultrySite
June 2, 2008

Chicks should be pulled from the incubator when they are ready, not according to the clock, says hatchery technology company, Pas Reform.

General principles
The length of the incubation period is influenced by several factors:

The time needed to complete development from a day-one embryo to a day-old hatchling depends on the species. The chick embryo hatches after 21days of incubation, while turkey poult and ducklings hatch after 28 days. However, within each species, the duration of incubation and thus the pulling time varies between different batches of eggs.

Flock age is also an inherent factor in determining hatching time. Embryos from flocks younger than 30 weeks may need an additional 5-7 hours to complete development compared to older flocks. Incubation time increases again when flocks are older than 60 weeks.

Storage of the eggs also has a major impact on the length of the incubation period, probably because the albumen and yolk undergo physical changes during storage. Prolonged periods of storage are known to be damaging to the early embryo. When eggs have been stored for periods exceeding three days one hour extra incubation time should be applied for every additional day of storage over three days.

Incubation temperature has proved to be the most important external factor for determining the rate of embryonic development and growth. In turkeys, the hatching time increases by 6-8 hours, depending on breed and flock age, when the incubator temperature is decreased by 0.5°C. For chickens, the incubation period increases by four hours per 0.5°C decrease in temperature set-point. However, it is also important to note that when the incubator temperature is too

high, in excess of 39°C (102.2°F) after day 16, the incubation period also increases.

Advice
Given the above information, it is clear that day-old chicks should not be pulled 'on the clock' but rather when the chicks are visually ready for take-off.

To achieve the highest chick quality and most optimum spread of hatch, the time to pull chicks out of the hatcher is when 90-95 per cent of chicks are dry. The last 7-14 chicks per tray (5-10 per cent of the batch) may be wet around the neck. In addition, the optimum time can also be recognized by crushing the empty shells. When the shells are brittle and feel dry, the chicks were pulled at the right time.

When chicks are collected earlier, too many chicks will be classified as second class because they are not completely dry.

When chicks are left too long in the hatcher, the risk of dehydration increases and with it, the risk of mortality in the first week. Furthermore, dehydration of chicks should be avoided at all times because this has been shown to affect chick performance at farm level.

For further information or advice, please contact the Pas Reform Academy.

Understanding the Physiology of Lighting for Broiler Breeders

By Mike Wineland, Departmental Extension Leader, Poultry Science, NC State University and published in the North Carolina Poultry Industry Joint Area Newsletter Winter 2008.

Manipulation of the light environment for the bird can optimize reproductive function, alter behaviour, metabolic rate or physical activity. Lighting programmes are quite different for pullets and hens but there are a number of concepts of light utilized by both which are shared. Reception of light by the pullet for reproductive purposes is not primarily through the eyes but rather by a part of the brain termed an extraretinal receptor (a receptor not in the eye). Light energy (in the form of photons) penetrates the feather, skin and skull to reach the receptor. The ability to penetrate to the extraretinal receptors is a function of the intensity and wavelength of the light source.

The pullet must be prepared for lay in the pullet house and allowed to become and then be capable of maintaining sexually maturity in the breeder house. The pullet must be able to interpret daylength. The bird has been shown to interpret daylength by the occurrence or lack of occurrence of light during a

'photosensitive period' which occurs 11-16 hours after dawn in a 24-hour day. The pullet perceives a long day if after a 'dawn'; or lights on, she then subsequently perceives light during the photosensitive period. If no light is perceived during this photosensitive period, the bird interprets the day as a short day similar to what we experience in winter time in the US. The pullet will be properly prepared if she receives at least 8 weeks of short daylengths of 8 hours just prior to moving to the breeder house. Generally, she will be on short day for a much longer period in the pullet house to help control activity and proper weight gain. Problems may arise if someone turns lights on when they should not be turned on or if there are light leaks in a blackout house when lights are off but occurring during a normal long day such as experienced during the summer months. This is why it is essential to have good blackout conditions in the pullet house.

In the breeder house, the hen is stimulated with long days to initiate development of the ovary and reproductive tract. The long days are perceived during the photosensitive period occurring 11-16 hours after dawn as described above. If the hen has been properly sensitized so that she can respond to the long daylength and she is physically ready with regard to age and body condition, she will commence production quickly. The hen's egg production will climb to a peak production rate and then gradually decline as she ages. The reason for this is that she is being photostimulated by long daylengths at the same time as she is starting to become photorefractive. Photorefractoriness is the condition when the hen responds less and less to the stimulatory long daylengths we have given her in the breeder house. Photorefractoriness is attained much more slowly than the photostimulation process. This results in the gradual decrease in egg production. The rate at which the hen becomes photorefractory can be manipulated by the daylength in the breeder house. The longer the daylength, the more rapid is the onset of the photorefractory condition and reduced egg production. Shorter but still photostimulatory daylengths will allow the photorefractory condition to be attained slower and thus keep the hen in production for longer.

Managing the lights for breeder is a very complicated process. Thus it is important that the pullet and hen are properly managed and the house conditions be optimal to obtain good egg production.

TRANSPORT AND SLAUGHTER

Research Incomplete on the killing of chickens - Controlled Atmosphere Stunning

North Denver News

Written by Staff
Thursday, 10 April 2008

Based on input from animal-science veterinary and ethics professionals, American Humane Certified says that research is not conclusive or complete at this time to support Controlled Atmosphere Stunning (CAS) as the preferred method of poultry slaughter.

Bernard Rollin, Ph.D., professor in the departments of animal services and philosophy at Colorado State University and a member of the American Humane Certified Scientific Advisory Committee, said, “There is no distress as severe as the feeling of not being able to breathe. This feeling of suffocation is not only a result of lack of oxygen, but also the inability to blow off carbon dioxide. CO2 drives respiration. Even though CAS creates unconsciousness, there must be a period when the animal feels a sense of suffocation. For this reason, I do not accept CAS as a humane method of euthanasia.”

Yvonne Vizzier Thaxton, Ph.D., professor of poultry science at Mississippi State University and a member of the American Humane Certified Scientific Advisory Committee, said, “The main animal welfare issue with poultry slaughter is the ability to induce instantaneous insensibility. The requirement is that all animals be insentient when slaughtered. Both electrical stunning and controlled atmosphere stunning fulfill this requirement, when properly administered. We are continually examining potential technologies that may be equal to, or improve upon, those in current use.”

John McGlone, Ph.D., professor of animal and food sciences, and director of animal care services at Texas Tech University, and Scientific Advisory Fellow of the American Humane Certified program, said, “Each current method of poultry stunning has issues that may be resolved in the interim, through close audit and further research and development. Neither animal processing facilities nor retail food operations should be forced to implement costly new technologies that do not generate clear improvements in animal welfare. To do so would not support a sustainable food chain.”

The American Humane Association, the oldest humane organization in the U.S. focused on the welfare of both children and animals, created the first and original humane certification label program. Tim Amlaw, program manager of American Humane Certified, said, “We believe that humane slaughter of food animals must be performed using the best available science and in a manner that causes minimal or no distress to the animals. Based on our scientific experts and existing evidence, we are not aware of any science-based conclusive evidence that the distress chickens, turkeys or other species experience in existing electric stunning methods is greater, or less than that with gas anesthesia induction. Any claim that CAS is more humane is simply not founded on current science and should not be forced on the industry, at this time.”

Pig comfort during loading & transport affects survival

Source: April 30, 2008
Atlantic Swine Research Partnership/ Newsletter
Take Measures to Reduce Animal Stress

The journey for pigs on the way to market can be hot and humid. That's why it's important to keep conditions as comfortable as possible, before and after shipping. Over the past three years, Prof. Cate Dewey, Department of Population Medicine, University of Guelph, has led a team of researchers in the study of pig transport. She found that roughly 0.17 percent of pigs die between the farm and processing at the plant. Significant quality can be lost through improper transport, so she's urging producers to be prudent during shipping. Her study shows how certain loading procedures, such as using prods and steep chutes, may cause quality to suffer. "I know that if producers follow specific guidelines, they will be able to reduce in-transit losses," says Dewey.Researchers observed loading procedures at 48 farms.

These farms were divided into high and low loss categories, and compared farms of similar sizes. The study found several practices that would reduce animal stress. For example, pigs are afraid of shadows, so minimizing shadows can help that problem. As well, pigs like to get to know each other and travel with those familiar to them. So, Dewey encourages farmers to transport pigs in the groups that lived in the same pig pen. And finally, loading and offloading onto trucks causes a lot of stress for animals, so assembly yard use should be minimized where possible.Transport stress is a particular problem in the summer. When combined with motion sickness and high temperatures, stress can be fatal, or cause meat that's likely to be too pale and soft, or too dry and firm. The problem begins when pigs are moved out of barns or pens. Dewey recommends minimizing the use of electric prods, which despite promoting stress, are still used by 60 per cent of people loading pigs. Other measures that can be taken to reduce stress include eliminating narrow hallways and right-angled corners which lead to jams (which frustrates pigs), and lessening the ramp incline for loading. Ramps should be no steeper than 25 degrees; anything more than that is perceived as a straight wall, in a pig's mind. Dewey says the benefits of this study could be widespread, if its recommendations are followed. Producers could experience fewer losses and packers and consumers end up with better products. "It all comes down to improving transport for pigs," she says.

This paper, “Take Measures to Reduce Animal Stress,” authored by Arthur Churchyard Ontario Pork News, April 2008.Other researchers involved in this project are Prof. Tina Widowski, Animal and Poultry Science; Prof. Robert Friendship and Dr. Charles Haley, Population Medicine. Funding was supplied by Ontario Pork, as part of the In-Transit Loss Committee of producers, transporters and packers and by Ontario Ministry of Agriculture, Food and Rural Affairs.

GENERAL

Prairie Swine Centre's Sow Research Unit Open

Wednesday, June 11, 2008
ThePigSite News Desk

SASKATCHEWAN - “Reducing costs and improving efficiency is the most important aspect of pork production today, and applies as much to the research community as it does to commercial pork producers,” notes Dr. John Patience, President of Prairie Swine Centre.

“This new sow barn embraces that important concept in design, equipment selection and operational procedures.” Examples of the efficiency aspect in design include replacing four buildings constructed in 1980 with one building. In consideration of equipment, high efficiency gas heaters in all rooms, a new high efficiency hot water heater, and in the farrowing rooms low wattage heat lamps will all lower the annual utility costs. Combined these factors should reduce energy consumption by 25-30%. The largest savings however will occur in the daily operations of the pig barn. By having automated feed delivery to all pens, and self feeders for all nursing sows, staffing will be much more efficient. The design of the equipment means less time opening gates, handling and moving animals at breeding. “In total this barn should be at least 30% more labour efficient that its predecessor” notes Dr. Patience.

“Shannon Meyers, General Manager of Fast Genetics and a member of the Board of Directors of Prairie Swine Centre reinforces the importance of being efficient, “the industry is cyclical and regularly goes through periods of profit and loss, only pork producers that know their costs and focus on efficiency will be there to participate when the good prices return. This barn will meet head-on the need to be efficient. It is important to note however that in improving our efficiency we did not have to give up on the unique features required for an effective research design.” The barn has the ability to simulate standard production practices as well as incorporating features such as free-access stalls (designed in Denmark) so that comparisons of various management systems used in the industry can be compared within this facility. Looking ahead, the barn incorporates the industry trend of accommodating practices such as increasing the age at weaning.

The construction of the new Sow Research Unit was made possible through a Wedge Funding Grant, a joint initiative of Agriculture and Agri-Food Canada and the Saskatchewan Ministry of Agriculture.

Participating in the Official Opening ceremonies at 1 pm today was Dr. Jim Basinger, Acting Associate Vice-President Research, University of Saskatchewan, Mr. Neil Ketilson, General Manager, Sask Pork, Mr. Shannon Meyers, and Dr. John Patience.

PSC Research Internationally Recognized

ThePigSite News Desk
Wednesday, June 11, 2008

"The Prairie Swine Centre is highly regarded by the local and regional producers but, if you were to talk to anybody across Canada regarding the swine industry they'd recognize the importance of the Prairie Swine Centre to their own activities," observes University of Saskatchewan acting associate vice president research Dr. Jim Basinger.

"Beyond the borders of Canada the swine industry is of global importance. Many countries have tremendously strong industries."

He suggests it would not be unlikely to drop into any major centre around the world that is concerned with swine production and find that they would recognize not only the name of the organization but they would know some of the researchers who are involved in anything from animal nutrition to animal behavior.

The approximately $2 million upgrade replaced infrastructure constructed by the university more than 25 years ago.

The original facility, built in 1979, consisted of four main buildings including two 100 sow barns, a small 50 sow barn and a grow finish barn.

"Basically what we did was we undertook a complete replacement of our gestation, lactation and breeding areas and gilt development areas; consolidated what was previously in four barns into a single barn," says Prairie Swine Centre outgoing president and CEO Dr. John Patience.

Cost Reduction and Enhanced Research Capabilities Drive Renovations" The main reason was to lower our cost of operation," says Dr. Patience. "The secondary objective was to enhance our sow research capability."

"This is a project we started about three years ago, in terms of evaluating how we were going to be a more efficient research centre," says acting president and CEO Lee Whittington.

It starts off by being a more efficient pork producer. We were looking for ways to reduce our cost of production. We looked at our 30 year old buildings and decided that there was a lot of new technology out there that we could incorporate.

Dr. Patience adds, putting into one barn what was previously done in four different barns immediately leads to huge improvements in labour efficiency and there are some energy efficiencies that should save money as well.

Improvements Expected to Ease Staff Workloads
PSC operations manager Brian Andres recalls the labour inefficiencies were so great, with staff running between barns, that it was felt something had to be done.

He explains, the old facility, including the grow finish barn, required a compliment of five people to run production, breeding, farrowing and nursery as well as grow finish. That number can be reduced by one and a half to two staff members because of the increased efficiencies.

As well, Andres says, there are eight semi-intensive rooms where animals are all fed by hand.

“These rooms have five pigs per pen, approximately 100 animals per room and those all have to be fed by hand. The automatic feed systems put in grow finish as well as the automatic feed systems throughout the new facility will greatly improve efficiencies.”

Whittington estimates, “That, in itself, is going to save hours and hours everyday probably reducing the overall labour bill by somewhere around 30 percent.”

As well, he notes, replacing four buildings built in 1980 with one brand new 2008 building that boasts more efficient heating and lighting is expected to reduce utility costs by 30 percent. He believes that represents a huge opportunity as utilities have jumped into number three spot overall in terms of costs of production for commercial pork producers.

Gestation Housing Complies with European Standards
The new facility has several other improvements.

Dr. Patience notes, while the breeding area is very much like any other conventional breeding area, the gestation area is quite a bit different employing walk in lock in stalls, or freedom stalls. “They allow the sow to walk into the crate and there's a mechanism that closes the gate behind her and then, when she's finished eating and wants to leave the stall, she just backs up against the gate and it opens up again.”

The stall system was developed in Denmark to meet European standards.

In Denmark legislation requires more space footage per sow than is standard in North America says Helena Echberg, the North American regional Manager with Egebjerg International.

“Our farrowing pen seems to be a little larger than the farrowing pens in North America.”

She notes group based housing has been researched in Denmark for the last 20 years and there have been a lot of different systems.

“One of the systems that is recommended and preferred by Danish farmers is the free access stall where the sow can walk in and out as she pleases.”

“That was one feature we really wanted because it's an excellent model,” says Dr. Patience.

“It's popular in Europe therefore we can suspect that, as group housing becomes more common in North America, it'll at least be a system that will be looked at and we'll have the benefit of years of research to see how the system really does work.”

European and North American Standards Moving Closer
Echberg foresees a time when European and North American standards will come closer together.

“Over the last year, especially, there has been a lot of changes in the production in North America and you see it's going toward the same standards that we have in Europe.”

She believes, as North Americans start to talk more about housing sows in groups, it is important to see how this technology can be adapted into the North American way of producing sows.

PSC Moves from Three Week to Four Week Weaning
In the farrowing rooms the biggest innovation is the switch from three week weaning to four week weaning.

Dr. Patience says that was under the advice of industry who said there's lots of units out there that are weaning at three weeks. They can do that kind of research but, with industry moving more and more to four week weaning, they thought we should move to four week weaning to undertake research to support that change.

Ongoing Research Key to Ongoing Economic Viability
Saskatchewan Pork Development Board general manager Neil Ketilson believes research is always important to everybody.

“You always have to stay ahead of the game rather than just trying to stay even.”

If you fail to do research, if you fail to invest in new infrastructure over time eventually you become stale. Other more competitive areas of the world will take over and you'll lose your competitive edge, he says.

Dr. Patience agrees, we have to be looking to the future.

“I've often said that, if people were to analyze pork industries around the world in different countries, those countries that years ago gave up on research dealing with economic efficiency and competitiveness are those industries that we now see going into decline.”

Aurora Dairy, CSU sign research agreement

MCT Regional News
Wed 23 Apr 2008
Section: General
Byline: Greeley Tribune, Colo.
Source: McClatchy-Tribune Regional News

Apr. 23--BOULDER -- Aurora Organic Dairy and Colorado State University have announced a multi-year, $500,000 master research agreement.

Aurora, a leading U.S. provider of high-quality private-label organic milk and butter based in Boulder, will work with CSU's College of Agricultural Sciences, College of Veterinary Medicine and Biomedical Sciences and Department of Food Science and Human Nutrition, which is in the College of Applied Human Sciences. CSU professors and leading professionals in agricultural sciences will lead the research initiative, funded by a three-year $500,000 grant from the Aurora Organic Dairy Foundation.

The research, according to a press release from Aurora, will focus on animal welfare, veterinary medicine, growing perennial forage crops and optimizing soil fertility for organic pasture development in the Rocky Mountain West.

Findings will be shared with the organic agriculture community to build the industry's knowledge base and capabilities for continuing the sustainable growth of organic agriculture, particularly in Northern Colorado -- one of the most productive dairy regions in the country, and home to CSU.

Aurora operates organic dairies in the Kersey and Platteville areas of Weld County.

The partnership will provide students enrolled in CSU's Organic Agriculture Certificate Program with scholarships, and hands-on learning and research opportunities through on-farm internships.

The research partnership will be based at Aurora Organic Dairy's Platteville dairy farm. CSU students will conduct the research at Aurora Organic Dairy's three dairy farms in northern Colorado, as well as on CSU's Agricultural Research Development and Education Center north of Fort Collins.

Namibia: New Test for Foot and Mouth Disease

The Namibian (Windhoek)
24 June 2008

SCIENTISTS at the Australian branch of the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) have developed a new test for foot-and-mouth disease that involves no infectious viral material and can differentiate between infected and vaccinated animals.

This "DIVA" test of that country's CSIRO Animal Health Laboratory could transform how foot-and-mouth disease is controlled in future because it's relatively inexpensive and does not require infectious viruses to produce the reagents, it said last week.

The British government decided against using vaccines to control a major outbreak in 2001 because the tests available to them could not distinguish between infected and vaccinated animals.

The outbreak was finally contained only after the slaughter of more than 6 000 000 animals. Most were not infected.

"Our test is the first in the world to be built entirely from non-living materials produced in the laboratory," says Janine Muller, who developed the test with CSIRO colleagues while completing her PhD.

"We have been able to build and manufacture the critical components of our test from the ground up. We unravelled the structure of an antibody to an important protein the virus injects into cells.

They then generated its genetic template and used it to engineer the antibodies at the heart of the test," Muller told reporters.

Foot-and-mouth disease, a highly contagious viral infection, is considered the most economically devastating disease affecting farm animals worldwide, especially in Africa.

Botswana is presently killing livestock in western Botswana after a recent outbreak of the disease.

The test itself is a faster and more sensitive way of detecting the disease in livestock.