RESEARCH WATCH January 2009

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BEEF CATTLE

Make navel care a priority

Beef Quality Assurance
November 11, 2008
The Beef Site

Calves without navel disinfection have an 11 percent higher death loss and 14 percent higher rate of pneumonia than those that are disinfected.

Sam Leadley, calf and heifer management specialist with Attica (N.Y.) Veterinary Associates, recommends these simple procedures to help
lower death loss and pneumonia rates.

a.. Use fresh navel dip. Always dump out soiled dip and start with fresh dip for every calf.

b.. Wash off mud with dip. Mud can contain manure, dirt and urine. Use enough dip to get the umbilical cord and navel opening fully clean.

c.. Coat the full length of the cord in clean navel dip. Also be sure to coat the navel opening in the belly with the dip.

d.. Re-dip the navel after you remove the calf from the dam. This dipping process prevents infections three ways. First, it washes away dirt and pathogens. Second, the solution kills germs on contact. Third, the alcohol base of the dip helps dry up the umbilical cord, preventing pathogens from going up the cord into the calf's body.

Information on Winter Animal Care is Readily Available

Consort Enterprise
Wed 07 Jan 2009
Page: 10
Section: News
Source: Consort Enterprise

There are many management decisions that need to be made when feeding beef cattle and calves through an Alberta winter. Animal care in winter, especially during the times of extreme low temperatures, takes a little extra time and planning.

Colder weather and snow can cause many different problems when feeding and watering animals. Fortunately, there are many information sources that producers can turn to for help and advice in making the best choices possible when it comes to overwintering livestock.

"The body score of individual animals is a factor that needs to be considered along with the temperatures and the snow cover that animals have to contend with," says Barry Yaremcio, beef and forage specialist with Alberta Agriculture and Rural Development, Stettler. "Thin animals have less fat cover than those in good condition. Fat is a good insulator, which in turn helps reduce energy requirements to keep the animal warm. For example, a thin cow in body condition score 2, approximately 100 pounds lighter than a

cow in good condition, requires an additional 1200 pounds of hay to get through the winter. Thin animals cannot tolerate the cold as well as animals in good condition."

Energy conservation is key for animals to keep warm and avoid unnecessary weight loss. Portable wind fences to keep animals out of the wind are a big help. With snow falling almost daily, it is necessary to spread straw onto the bedding pack frequently so that the animals stay dry and clean. Cows that lie on snow require 25 per cent more energy to keep warm compared to those that are on straw.

Producers are encouraged to take advantage of the readily available information on Alberta Agriculture's website by visiting www.agriculture.alberta.caand searching animal care in winter. As well as a number of available fact sheets, livestock specialists have posted helpful information on several frequently asked questions. Another information source is http://afac.ab.ca/alps/beaware.htm,a farm animal welfare resource centre, funded by the project Putting Animal Welfare on the Agenda. While it's beneficial to plan a winter feeding program well in advance, it's never too late to seek information about providing good animal care.

Take the stress out of dehorning

Beef Quality Assurance
November 11, 2008
The Beef Site

Dehorning can be a very stressful process. It is a best-management practice to avoid any changes in a calf's routine just before and for a week after dehorning. Lingering effects of stress on a calf can result in lowered immune defense and stunted growth.

Follow these practices to make dehorning less stressful:

a.. Dehorn before 120 days of age. The earlier you can dehorn, the better. Sam Leadley, calf- and heifer-management specialist with Attica (N.Y.) Veterinary Associates, recommends doing it between three and four weeks of age. At this age, the amount of tissue to be removed is limited to just the horn bud. Also, calves at 120 pounds are much easier to handle than 300-pound calves.

b.. Dehorn before the diameter of the horn base grows to a diameter of 1 inch.

c.. Avoid dehorning when doing other stressful processes, such as castration or vaccination. All of the stressors together can significantly reduce feed intake and stunt growth. When done alone, especially at a young age, dehorning can be fairly stress-free.

Visit www.bqa.org for more information on dehorning.
Additionally, contact your state Beef Quality Assurance coordinator to become BQA certified and join a growing number of producers committed to producing the best beef possible.

Timely Marketing of Cull Cows: Every Cattleman's/Dairyman's Responsibility
The Beef Site
November 26/08

Short-term, gummer and smooth-mouth are all terms cattlemen use to describe their older bovines. They have produced well for the past 10-12 years. However, due to age, lack of teeth and an anticipated decline in production, they are forced to retire, writes Ron Torell - published in the Ohio State University Beef Team Newsletter.

Many cattlemen try to squeeze that last calf, or in the case of dairy cows, that last drop of milk before culling her. Humane treatment and timely marketing of these animals as a means of eliminating nonambulatory cows at sale barns and harvest facilities is every cattleman's responsibility. Let's rethink that last calf and that last drop of milk.

Prices for cull cows are based on their expected USDA carcass grade. The most common grades, in order of the least amount of marbling and dressing percentage to the greatest, are: canner (very thin, body condition scores of
2 and 3); cutter (thin body condition score of 4); utility (moderate body condition score of 5); and commercial (fleshy body condition score 6 and above).

Both price per pound and dressing percentage significantly increase with the higher body condition score animals. This economically favors marketing these cows in a timely manner prior to them losing body condition and falling into a lower grade. Most non-ambulatory animals are emaciated and would be classified in the canner, very thin body condition score category.

According to Dr. Dan Drake, Yreka, Calif., farm advisor: "A major reason these old cows decline in production and body condition is due to their reduced ability to breakdown feed stuffs. This is primarily due to loss of the teeth.

"The digestive system of the ruminant is dependent on small particle sizes for proper digestion. Because the particle size of the feed stuffs consumed by these old cows is increased, passage rate is slowed, thus consumption is reduced.

"Nutrient requirements of these old cows have not increased; rather her consumption and feed efficiency have both decreased. The combination of the two requires that these cows be placed on a more nutrient dense ration with smaller particle size and softer feed. We need to do more of the feed breakdown for the cow," says Drake.

Glenn Nader, Yuba County, Calif., farm advisor, feels that many of these old cows have lost some of the villa in the lining of the digestive tract, which adds to the lowered feed efficiency and digestion. Additionally, Nader feels functionality of some internal organs such as the liver and kidney is compromised in many of these old cows. Nader feels that these old cows need to be pampered if they are kept for the last calf.

"They can no longer produce with the same feed and under the same conditions as the main cow herd," he says. "Rations such as chopped hay with a concentrate work well on these old smooth mouth cows. This is a nutrient dense ration that is high in protein and energy. More importantly, because it is chopped, the particle size of the feed is small. This compensates for the old cows lack of ability to break that feed stuff down herself."

"If you keep these old cows for one more year, you have to manage them differently than the main cow herd," says Dan Gralian, manager of the TS Ranch of Battle Mountain, Nev., and current president of the Nevada Cattlemen's Association. "If you do not provide that extra feed and care, a dink calf and a shelly canner cow is the result. The

shelly canner cow is what the industry is trying to avoid through timely and early marketing of these old cows. Shelly canners pose a humane treatment issue to the industry. Prevention is always the best cure."

What once worked from a marketing standpoint for Rebel Creek Ranches of Orovada, Nev., may not work today with higher winter feed costs. Ron Cerri, owner/ manager of Rebel Creek Ranch and president-elect of the Nevada Cattlemen's Association, would calve these old cows in March and run the pairs on irrigated pasture in the spring and early summer. The calves would be weaned at about 170-days of age in mid- to late summer with the cow being immediately sold while she still had good body condition.

"By timing the marketing of these old cows for late summer the better cull-cow market was hit, thereby adding value, which offset the added cost of better winter feed for these short-term cows," says Cerri.

Henry Smith, of Brownsville, Calif., makes a living buying small bunches of bred, short-term cows. "You have to be careful which cows you buy," warns Smith. "We buy old, sound cows and are able to purchase them just over rail price. We have access to byproduct feeds here in central California. These old cows do well during the winter. We calve them out, place the pairs on grass until mid- to late summer, wean the calf and sell the open cow."

A University of Nevada economic evaluation on heifer development shows that on average, most cows have paid for themselves by age 6, showing that the longer a cow stays in the herd, the more profitable she becomes. Her production may decline after 11 years of age, so producers need to recognize the impact of longevity on the total cost of production. Anything beyond those six years certainly has economic significance. This supports keeping a cow in the herd as long as she is productive and breeds back provided the added cost of winter feed for these aged cows is reasonable.

Jon Griggs, manager of Maggie Creek Ranch of Elko, Nev., sees a need for timely marketing of other classes of cattle. "Lump jaw, permanent lameness, bad eyes, poor bags — catching these ailments early and marketing these cows in a timely manner before these conditions pose a health or humane treatment issue is paramount to our industry's survival," concludes Griggs.

Quiet Cattle Produce the Best Beef

TheCattleSite News Desk

Friday, November 28, 2008

AUSTRALIA - Research carried out by the Beef CRC indicates an animals' temperament can affect its long term growth rate and reduce carcass and meat quality.

The findings form part of a PhD project undertaken by Linda Cafe, Technical Officer with the New South Wales Department of Primary Industries (NSWDPI) in Armidale.

"Temperamental or 'flighty' cattle grow more slowly and produce smaller, leaner carcasses with tougher meat than calmer animals," Ms Cafe said.

The study involved Brahman heifers and steers that were backgrounded at the Glen Innes Research Station and then finished on grain at the Beef CRCs 'Tullimba' feedlot.

The cattle were yard weaned on their home properties and overall, were a very manageable group of weaners.

The cattle were assessed for temperament regularly during backgrounding and in the feedlot using flight speed and crush score, two temperament measures which will be familiar to industry.

"Flight speed was calculated in metres per second by using the animals' flight time. Flight time is the time it takes to cover a short distance after leaving a weighing crush. The crush score indicates how much agitation the animal shows while confined in the crush. A score of one is very calm while five is highly agitated," Ms Cafe said.

The cattle were grouped into three temperament categories based on their backgrounding flight speed: 'quiet', 'average' and 'flighty'.

"The herd quickly became used to the intensive handling required for the experiment. While the cattle became calmer over time, the 'flighty' cattle still recorded the highest flight speed throughout the experiment."

"The 'flighty' cattle also had lower individual feedlot intakes," Ms Cafe said. "But there was no difference in feed conversion ratio or net feed efficiency between the three groups. It simply appears that the poorer growth rates in the 'flighty' cattle were related more to a lower motivation to eat."

Ms Cafe said after 120 days on grain the 'flighty' animals yielded carcasses which were 10 per cent lighter than quiet animals with 18 per cent less rib fat. She added they also tended to have less tender meat

"The 'flighty' animals were about half a kilogram higher in shear force. Shear force is a measure of how much force it takes to cut through a piece of meat. It can be likened to taking a bite from a piece of steak," Ms Cafe said.

Ms Cafe said the results confirm selecting cattle with better temperaments rather than culling those with poor temperaments can not only improve productivity but can improve safety for the cattle and their handlers.

"The benefits may be more apparent in more intensive systems such as the feedlot, but they will apply to any animal which ends up on a truck going to an abattoir," she said.

Gender Selections Reduce Newborn Slaughter
TheCattleSite News Desk
Tuesday, December 09, 2008

DENMARK - Using gender-selected semen from beef bulls to inseminate organic dairy cattle ensures that it is economically viable to produce high-quality organic beef and reduces the problem of having to slaughter newborn Jersey bull calves.

On an organic dairy farm with Jersey cows it does not pay to fatten up the bull calves. Many bull calves are therefore put down immediately after birth, which is an ethical problem in any form of production.

The organic organisations are therefore investigating different options in order to prevent the slaughter of the newborn calves. One of the options is to use gender-selected semen, which means the farmer can himself select the sex of the calves. This technology is not allowed in organic farming, but there is sufficient interest in the technology that approval for its use in organic farming may be sought.

Scientists at the Faculty of Agricultural Sciences at Aarhus University have therefore analysed the impact of the technology on the production and economy of organic milk producers.

The basic idea is that the best breeding heifers in the herd are inseminated with gender-selected semen so that they breed nearly exclusively heifer calves that will be destined for the dairy herd. In this way, only the best stock will be part of the breeding programme and the farmer will achieve the best breeding progress for his herd.

The lowest-yielding cows are inseminated using semen from beef bulls. This means they produce fast-growing calves of a good meat quality. As it is profitable to fatten these up, you avoid the problem of having to slaughter newborn calves.

The two scientists Jehan Ettema and Jan Tind Sørensen from the Department of Animal Health, Welfare and Nutrition have developed scenarios for the new technology. The scenarios operate with different conditions for the use of the technology and describe its consequences for production and farm economy.

The calculations show conclusively that if used correctly, the technology would mean significant improvements for the organic dairy farmer in terms of production and economy.

Whether the organic farmers would wish to make use of gender-selected sperm is another matter – and something that will be up to the organic associations to decide.

There is no doubt, however, that under the current conditions the use of gender-selected semen from beef bulls in dairy farming would give both a better meat quality and economy and would prevent the slaughter of bull calves.

Calming Cattle with a Familiar Face
TheCattleSite News Desk
Friday, December 12, 2008

AUSTRALIA - Re-grouping cattle less than two weeks prior to slaughter may reduce meat quality.

That' one of the findings from a Beef CRC study which looked at the physiological responses of cattle when their social groups change.

Feedlots often draft cattle for slaughter based on different market specifications; retaining those cattle which don?t meet the required guidelines.

But Dr Ian Colditz, CSIRO Livestock Industries said within two weeks of slaughter cattle enter a period when any stress may compromise meat quality.

"attle are very social animals. Separating them or mixing them with unfamiliar animals can evoke a stress response," Dr. Colditz said.

"Their immunity decreases and they are more susceptible to disease. The glycogen they produce breaks down quickly when cattle are stressed. This can affect post-mortem muscle pH levels and meat quality."

The study was conducted using two groups of Hereford and Angus steers. They were transferred from their property of origin after weaning and backgrounded on pasture before entering the Beef CRC?s ?Tullimba? feedlot. The cattle were fed for 70 days on a standard feedlot ration.

The experiment was designed to keep the cattle as two separate groups and at four, two or one weeks before slaughter, mix or regroup the animals into pen units comprising cattle from both breeds.

Dr Colditz said meat and blood samples were collected from the cattle before slaughter and from the chilled carcasses and a range of measurements analysed.

The biggest effect was in the group of steers regrouped one week before feedlot exit.

"This group had significantly higher meat compression values than the control steers. Increased compression and shear force values are objective measures of meat toughness and are usually associated with consumer perceptions of tougher meat," Dr Colditz said.

"Minimising the exposure of cattle to stressors during this period seems appropriate if you want to maximise beef quality," he said.

DAIRY AND VEAL

Group housing benefits dairy calves
Research shows dairy calves like hanging out in groups ; Not only that, but a BC calf care expert has found they actually gain better - but there are right and wrong ways of doing it
Ontario Farmer
Tue 16 Dec 2008

Page: B1
Section: Production
Byline: BY COURTNEY DENARD, ONTARIO FARMER
Dateline: London

New research shows that dairy calves not only prefer being raised in a group, they're actually better off for it.

Dr. Dan Weary, one of Canada's leading experts on calf care and a professor at the University of British Columbia, presented the latest information on group housing at the 2008 Dairy and Veal Healthy Calf Conference here recently.

Weary says that, like all farm management techniques, there are pros and cons to raising calves in groups. While the pros include a decrease in labour, an increase in social skills and the simple fact that calves just seem to like it better; the cons appear to be issues like cross sucking, competition and the spread of disease.

Although these negatives shouldn't be ignored, Weary explained that they can be managed and raising calves in groups can develop healthier and better producing cows.

"Placing calves in groups at a young age will have long term effects on the animal. Calves reared in groups know how to get on well with herd mates later in life and they're more dominant in the milking herd," Weary says.

But simply placing calves into groups may not be enough. Farmers need to pay attention to how the calves are grouped and what type of environment they're placed in.

When it comes to grouping calves, smaller groups work best. Weary's research compared two different sets of calves - one group made up of six to nine calves and a second group of 12 to 18 animals. Results indicated that calves in the smaller group had a 40 per cent lower incidence of respiratory disease, as well as a 40 g/d higher daily gain.

Stable groups are also better than dynamic groups. This means that farmers should manage groups in an all-in-all-out manner, rather than continuously putting new calves into the pens as they are born.

This way calves are grouped by similar age and body weight. "Stable groups had fewer cases of diarrhea and respiratory disease, and once again experienced a higher daily gain," says Weary.

After placing the calves in the appropriately sized groups, farmers should then consider the feeding system. Weary says a good system will mimic the natural feeding method shared between a mom cow and a calf. Allowing calves access to an artificial teat- either through and automatic feeder or another system- is a good option.

Pail feeding calves provides much less milk, much often, which is not as healthy for the calves. Research showed that a well managed teat feeding system also reduces cross sucking to very low levels.

Competition between grouped animals can be easily dealt with by ensuring that calves are placed in small groups and have more than one feeding station available to them. Increasing milk rations also helps.

Competition is even more reduced by placing a barrier between feeding stations - this can be as simple as a piece of plywood. Research revealed that a long barrier about the length of an entire calf is the best way to go.

The 2008 Dairy and Veal Healthy Calf Conference was organized by the Ontario Veal Association with funding provided by the Agricultural Adaptation Council.

Compost Bedded Pack Barns for Dairy Cows
The Dairy Site
December 12, 2008
Dairy housing systems have a substantial impact on the overall health and longevity of dairy cattle. By Marcia I. Endres, Kevin A. Janni and published in Extension

Compost Dairy Barns
A compost bedded pack barn (generally known as a compost dairy barn) is an alternative loose housing system for dairy cows that appears to offer very good cow comfort for lactating, dry, and special needs cows. The first compost dairy barn in Minnesota was built in late 2001 by Portner Brothers from Sleepy Eye. Many more have been built in the state since that time. Compost dairy barns require excellent pack and ventilation management for the barns to perform well. Producers need to use appropriate bedding in adequate amounts. The bedded pack needs to be aerated twice daily to refresh the surface and enhance microbial activity in the pack. Compost barns will not perform well if the cows are overcrowded. Producers must use excellent cow prep procedures at milking time. Producers can have problems with compost barns if these guidelines are not followed. Compost barns are not the answer for every dairy producer. It is important to always match the manager with the system in order to be successful.

Results of a cross-sectional field study on compost barns were recently published (Barberg et al., 2007a, Barberg et al., 2007b and Endres and Barberg, 2007). Additional field observations have also been reported (Janni et al., 2007).

In general, compost barns have an indoor or an outdoor concrete feed alley, a bedded pack (resting) area, and a 4-foot-high wall surrounding the pack. The wall separating the pack and the feed alley has one to four walkways for cows and equipment to access the pack. This wall is 4 feet tall and typically of poured concrete construction. The bedding material is aerated twice daily using a cultivator or chisel plow type of equipment to dry the surface and incorporate manure into the pack.

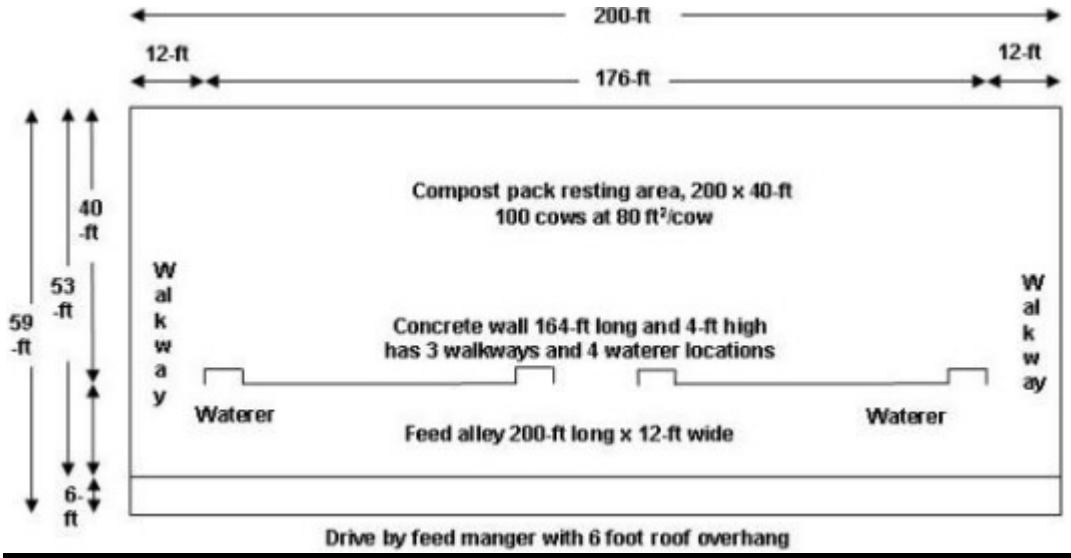

Figure 2. Compost barn layout for 100 cows with three walkways to the bedded pack, drive-by feeding, and 6-foot overhang. Waterers are against the concrete wall, separating the bedded pack from the feed alley and are accessed from the feed alley only. Not drawn to scale.

One of the reasons producers have adopted this alternative housing system is for improved cow comfort and longevity. A compost barn allows cows more freedom of movement than conventional tie stalls or free stalls. These barns may also provide a reduction in manure storage costs and needed space, and a savings in labor and manure handling.

Barn Layout

Compost barns can be laid out for drive-by feeding, covered feeding, or drive-through feeding with pens on both sides. They can also be used with feed bunks under roof or outside.

Compost barns are similar in many respects to typical free-stall dairy barns. Both have feed mangers, feed alleys, and waterers. The key difference is that the free stalls and free-stall alleys in free-stall barns are replaced with a bedded pack area in compost dairy barns that is aerated at least twice daily.

A 4-foot-high (1.2 m) wall surrounds the pack on three sides and separates the pack and feed alley. The exterior walls can be cast-in-place concrete walls on footings below normal frost depths or wood. Some producers have the posts supporting the roof embedded in the exterior walls, while others have the posts mounted on top of the wall. In either case it is important that a structural engineer or the builder understand all of the structural loads that need to be considered (e.g., manure load, lateral earth pressure, machine load, roof load, wind load, wind lift load, snow load, etc.).

The 4-foot wall separating the bedded pack and the feed alley usually has a fence on top to prevent cows from walking over the wall. The wall separating the pack area and the feed alley is cast-in-place concrete or movable concrete panels with a wide base, called Jersey walls.

Walkways, at least 10- to 12-feet wide, are recommended at each end of the wall separating the bedded pack and the feed alley (as a minimum) for cow and equipment access to the pack area. Long barns will require additional walkways.

Waterers are located along the feed alley. Waterers can be located on either side of the feed manger or adjacent to the concrete wall separating the bedded pack and the feed alley. Waterers are not located in the bedded pack area to minimize wetting of the pack, to keep the waterers cleaner, and to avoid having to adjust waterer height as pack depth increases.

Compost barns are recommended to have 3-foot eave overhangs to minimize the chance of roof runoff and rain being blown into the barn and onto the bedded pack. Roof gutters will help reduce roof runoff from being blown onto the pack. The ground surrounding a compost barn should be sloped to minimize rain and snow runoff from entering the barn and wetting the bedded pack.

Pack Management

Initially 1 to 1 1/2 feet of loose, dry, fine wood shavings or sawdust is put down to start a compost barn pen. Fresh bedding is added when the bedded pack becomes moist enough for it to stick to the cows after they rise from lying down on the bedded pack. We recommend that the bedded area provide at least 80 to 85 feet2 of resting space per cow for an average mature Holstein or similar-sized breed and 65 feet2 for an average Jersey.

The bedding material is aerated to a depth of 8 to 10 inches twice daily while cows are being milked, most often using a modified cultivator on a skid loader or small tractor. It is proposed that aeration is essential to incorporate oxygen for aerobic decomposition and to provide a fresh surface without accumulated manure for cows to lie down on after returning from the milking parlor or after feeding. Some producers in Minnesota are aerating the pack deeper (about 16 to 18 inches) using a chisel plow type of equipment and have observed a reduction in bedding needs and increased pack temperatures.

Typically, a semitruck-load of fresh dry sawdust (approximately 18 tons) is added every two to five weeks, varying by season, weather conditions, and cow density. Some dairies prefer to add a smaller amount of sawdust more frequently, such as once weekly. There are a small number of other dairies adding a thin layer of bedding every day.

Typically, no bedding material is removed from the pack area during the year, except in fall and spring. The bedded pack area is cleaned out entirely once a year in September or October. A load of clean sawdust is usually added after removal of the soiled bedding to provide a bedding layer 1 to 1 1/2 feet high to start the new pack. Some producers leave about half a foot of old material in the barn to help initiate microbial activity.

By the end of summer, most packs average 4 feet high. Several farms remove a portion of the pack material in the spring to provide space for bedding accumulation during the summer. The soiled bedding is spread on the fields according to the farm manure management plan. Some producers pile the spent bedded material to produce finished compost.

Adequate ventilation (air exchange) is needed to remove cow heat and moisture, as well as the heat and moisture that the biologically active pack generates. Sufficient air exchange is needed in cold weather to remove moisture from the pack and extend the time between bedding additions. Moisture, in large amounts, is commonly seen as steam rising from the pack during aerating in cold weather. This moisture needs to leave the barn with the ventilation air.

Compost barns are recommended to have 16-foot sidewalls to provide better ventilation and access for bedding trucks. The sidewall height for a compost barn is recommended to be higher than that for a free-stall barn to accommodate the sidewall opening lost due to the bedded pack walls. Many compost barns have mixing fans to blow air downward onto the bedded pack to help dry the pack surface. The fans must be hung high enough to provide head room for aerating equipment at the maximum pack height.

For our cross-sectional study, we took samples of the bedding material at two depths. These bedding samples were analyzed for moisture, ammonia, pH, total carbon (C), nitrogen (N), phosphorus (P), potassium (K), and electrical conductance (soluble salts) concentrations. Results are summarized on Table 1, including a column with recommended values for composting. The average carbon to nitrogen (C:N) ratio was 19.5:1. A C:N ratio below 25:1 may emit ammonia odor, which may influence the ammonia levels in compost barns.

The average bedding temperature measured at various depths was 108 F and the pack surface temperatures were similar to the ambient temperature. Temperatures were greater in the areas of the pack that were fluffier and that were not as heavily soiled or packed by the cows. This observation is consistent with the need for oxygen and air for microbial activity that promotes composting.

Table 1

	Average	Range	Recommended
Temperature, F	108	76-138	130-150
Moisture, %	54.4	28-78.9	50-60
pH	8.5	6.5-9.9	6.5-8.0
N, %	2.54	0.57-4.22	NA
P, ppm	3247	378-6668	NA
K, ppm	15,270	2568-29,570	NA
C:N ratio	19.5:1	10.9-87.5	25:1-30:1
Electrical Conductance, mmhols/cm	9.6	2.4-20.5	10 maximum

Costs

Barn building costs ranged from $33,000 to $300,000, with a cost per cow ranging from $625 to $1,750 (barn only, does not include milking parlor). The building costs ranged widely depending on the amount of on-farm labor utilized and amenities added.

Bedding material costs ranged from 35 to 85 cents per cow per day, depending on the source of sawdust and from how far it had to be transported to reach the dairy. Bedding costs and availability of bedding materials was by far the major concern expressed by the producers. Alternative bedding options are currently being tested. Preliminary results indicate that sawdust is the best option for these types of barn, but combinations of sawdust with other materials, such as finely ground soybean or flax straw, finely processed corn cobs, or wood chip fines can work relatively well.

Herd Performance and Udder Health

The average herd size for the herds enrolled in our cross-sectional study was 73 cows. The Dairy Herd Improvement Association (DHIA) rolling herd average was 23,005 lb (range of 18,306 to 27,304) and Somatic Cell Count (SCC) was 325,000 cells/mL (range of 88,000 to 658,000) for the test date nearest to our visit.

Statistical analysis of historical DHIA data indicated that 89% of the dairies had a significant increase in 305 mature-equivalent milk production when moving their cows from the previous housing system to the compost barn. The average increase was 2,105 lb/cow per year (range 870 to 2,934 lb). It is important to keep in mind that other changes were made to the dairy operation when moving cows to the compost barn, which most likely also contributed to the significant increase in milk production. Additionally, 57% of the dairies had an increase in heat detection rates (36.9% before and 41.5% after change in housing) and 71% of the dairies had an increase in pregnancy rates (13.2% before and 16.5% after change in housing). Herd turnover rates averaged 25.4% before and 20.9% after change in housing.

We found that 67% of the dairies had a reduction in mastitis infection rates (defined as percent of cows with a SCC>200,000 in each DHIA test date). However, only 43% of the dairies had a significant reduction in bulk tank SCC, with one dairy having a significant increase.

In general, a low level of contagious pathogens was detected in the milk bulk tank samples. One out of 12 farms had a high level of Streptococcus agalactiae, one farm had a high level of Staphylococcus aureus, whereas six farms had high levels of non-ag Strep, and five farms had high levels of coliforms (e.g., E.coli, Klebsiella, and Enterobacter) in the milk.

It is interesting to note that udder health and milk quality were not necessarily compromised when housing cows in this bedded pack system, especially when total bacteria counts in the bedding material were 9,122,700 cfu/mL (range of 2,035,562 to 22,562,604). It has been suggested that bedding should have less than 1 million cfu/mL to reduce the risk for mastitis. Therefore, excellent cow prep procedures at milking time and healthy teat ends are essential in a compost dairy barn system.

Cow Welfare

The feet and leg health of cows was good in the compost barns we visited. Overall, 7.8% of cows were clinically lame (locomotion score ≥ 3), with two herds having no lame cows. The average prevalence of lameness in compost dairy barns was much lower than the 24.6% (Espejo et al., 2006) and 27.8% (Cook et al., 2003) prevalence recently reported in free-stall barns and the 19.6% observed in tie-stall herds (Cook et al., 2003).

Overall, 25.1% of cows exhibited a hock lesion, with 24.1% having hair loss and 1.0% having a swollen hock. Seven of the 12 herds had no severe lesions. Hock lesions that occurred in the previous free-stall or tie-stall barn were most likely still present or healing in the compost barn. Weary and Taszkun (2000) reported that 73% (n = 1,752 cows) of cows housed in free stalls had at least one hock lesion, nearly three times the prevalence we observed in compost barns. Furthermore, Endres et al. (2005) observed in free-stall herds (n = 5,328 cows) that 14.1% of cows housed on mattress-based free stalls and 1.8% of cows on sand-based free stalls had swollen hocks.

Results on the prevalence of lameness and hock lesions in our study suggest that cow welfare, especially in relation to feet and legs, could potentially be better in these barns

than in stall systems. We had some concerns about dust, which could predispose cows to pneumonia or cause eye irritation, and air quality, such as ammonia and/or hydrogen sulfide levels. More research is needed in these areas.
Keys to Success with Compost Dairy Barns (Based on Limited Research):
Provide at least 80 to 85 feet2 per cow for Holsteins and similar-sized breeds and 65 feet2 for Jerseys. Some producers provide 100 feet2 per cow.
Use fine, dry wood shavings or sawdust for bedding. Alternative bedding materials are being investigated.
Aerate the pack twice daily 10 inches deep or deeper to keep it aerobic and fluffy. Biological activity helps dry the pack.
Add bedding when it begins to stick to the cows. (Have bedding supply available so you don't end up adding fresh bedding too late.)
Enhance biological activity to generate heat to drive off moisture, and ventilate the barn well to remove the moisture.
Use excellent cow prep at milking time.
Based on current observations, a compost dairy barn can be an adequate housing system for lactating dairy cows, especially for small- to medium-sized dairies or as a special needs barn in larger free-stall dairies. As with any system, optimum management is absolutely necessary to achieve desirable results. There are many housing options for dairy cattle, and producers should choose the option that will work best for them.

Effect of shorter dry period on mastitis
By Dairy Herd staff
Tuesday, November 18, 2008
Source: November 2008 Journal of Dairy Science

A 30-day dry period does not affect mammary gland health, but it may adversely impact subsequent milk production, according to new research in the November 2008 Journal of Dairy Science.

Washington State University researchers assigned cows from four herds to either a 30-, 45- or 60-day dry period. Cows assigned to the 30-day dry period received a commercial lactating-cow formulation at dry-off. Cows assigned to the 45- or 60-day dry period received a commercial dry-cow intramammary formulation at dry-off.

The researchers assessed the effects of dry period length on udder health by measuring intramammary infections and somatic cell counts. Here is a look at some of the results:

a.. Existing mastitis infections. Cure rates of existing mastitis infections were 72 percent and 81 percent for cows enrolled in the 60-day and 30-day dry periods. Cure rates for the 45-day and 30-day dry periods were 74 percent and 73 percent. These findings are not statistically different for either comparison group.
b.. New mastitis infections. In the subsequent lactation, the percentage of new intramammary infections ranged from 6 percent to 9 percent and did not differ between treatment groups.
c.. Somatic cell counts. Dry period length did not significantly affect linear somatic cell counts during the first six to seven months of the subsequent lactation.

d.. Milk production. Cows given a 60-day dry period were estimated to produce 2,631 pounds more milk (on a mature equivalent basis) in the subsequent lactation than cows given a 30-day dry period. However, cows given a shorter dry period had 30 more days of production in the previous lactation than cows given a 60-day dry period. So, in theory, the 30-day dry period cows had the opportunity to produce more milk in the previous lactation, says Larry Fox, professor in the College of Veterinary Medicine at Washington State. Furthermore, cows assigned to a 60-day dry period did not appear to give more milk in the subsequent lactation than cows assigned to a 45-day dry period.

Body condition score matters
By Dairy Herd Management staff
11/13/2008

A dairy cow has a desired body fat level and will increase or decrease feed intake to meet this requirement, says Phil Garnsworthy, dairy science professor at the University of Nottingham in Great Britain. Therefore, BCS is a useful management tool to assess the nutritional status of dairy cows.

Changes in BCS during early lactation highlight the role of body fat in controlling feed intake. The strong relationship between BCS at calving and change in BCS provides compelling evidence that cows have a target BCS in early lactation, he says. “Cows that are fatter than their target BCS mobilize body fat; those that are thinner than their target BCS gain body fat.” Of course, the rate at which a cow changes BCS toward its target is affected by diet composition as well as current BCS.

Recent reports indicate that average target BCS is lower now than it was in the 1980s, says Garnsworthy. “This is because cows selected for higher milk production over the past 30 years are genetically thinner, so they have a higher drive to mobilize body fat.”

Consequently, cows of high genetic merit are more likely to experience deeper and more prolonged negative energy balance in early lactation. “Negative energy balance is undesirable because it reduces reproductive performance and increases susceptibility to diseases,” he adds.

To reduce the impact of negative energy balance on cow health and performance, Garnsworthy suggests that BCS at calving should be no more than
0.5 BCS units above a cow’s target BCS. For example, cows with low genetic merit for milk yield (target BCS 2.5 to 3) should calve with BCS of 3 or less. Cows with high genetic merit for milk yield (target BCS 2 to 2.25) should calve with BCS of 2.75 or less.

Does cow comfort affect reproduction?
By Dairy Herd staff
11/13/2008

The full impact of cow comfort on reproductive performance has not been fully quantified. However, cow comfort can be linked to lameness, which in turn, can be linked to reproductive performance, says Nigel Cook, University of Wisconsin veterinarian.

There is reasonable evidence to suggest that cows housed in free-stall facilities require about 12 hours per day of rest in a comfortable stall. When a cow's time budget is challenged through increased time out of the pen for milking, overstocking, poor stall design, heat stress and prolonged time spent in lock-ups, the primary outcome is increased lameness. "There is a significant stress response to inadequate rest," Cook contends.

Reducing lameness is one way to positively impact reproductive performance, he adds. "Recent multifactorial analyses have also highlighted the negative association between breeding-pen stocking density and breeding efficiency, highlighting the importance of cow comfort," Cook says. "Until recently, this area has not received the attention it deserves."

The feed bunk effect
Feeding space and feed barriers have definite effects
on dry matter intake for cows
Ontario Farmer
Sat 01 Nov 2008
Page: 30
Section: News
Byline: BY PEDRO NOGUEIRA

One of the key aspects in dairy production is dry matter intake. It is fundamental to ensure that cows eat enough feed to maximize production and prevent diseases.

This is particularly important when feeding lactating and close-up cows.

Several studies show that when cows eat well before calving they normally tend to perform well after calving. On the other hand, according to statistics from veterinary studies, the complex of ketosis, fatty liver, and displaced abomasum has emerged as the most frequently investigated herd problem.

In these herds, cow behaviour and social factors appear to be the primary risk factors. Dr. Ken Nordlund and his colleagues from the University of Wisconsin say that "where poorly formulated rations and inaccurate delivery systems were once the primary risk factors, we increasingly see poorly staged pen moves and overstocking as the key risk factors in our industry today."

According to them, this promotes a disruption of dry matter intake leading to the problems indicated above.

A lot of research has been, and continues to be, done on the nutritional aspects of the diet. Even with advances in this side of the equation, there continues to be research conducted on cow behaviour to try to understand which factors promote or discourage feeding activity in dairy cattle, thereby leading to improvements in feeding management practices.

Cows are social animals categorized as allelomimetic, meaning they all want to do the same thing at the same time. They are also described as crepuscular, meaning they are particularly active in the twilight hours of dawn and dusk.

This is particularly true for grazing animals. For housed dairy cattle, according to the work from the Animal Welfare Program at the University of British Columbia, times of feeding activity are typically associated with the time of feed delivery and milking, regardless of the time of day at which these occur.

These characteristics have consequences on stocking density regarding requirements for stalls and feeding space, because if all animals want to do the same things at the same time, the facilities should be dimensioned having this in consideration.

Effect of feeding space on aggression and feeding behaviour

Modern free-stall barns normally have 0.6 m of feed alley space per cow. The mentioned program from University of British Columbia has been actively studying feeding behaviour of dairy cows.

They conducted a study where they doubled the amount of feeding space from 0.5 to 1 m per animal to see if this would lead to more space between cows at the feeder and fewer aggressive social interactions among cows, ultimately allowing cows to increase their feeding activity, particularly at peak feeding times.

They concluded that when provided with more space at the feeder, cows increased distances from their nearest neighbour, reduced their frequency of aggressive interactions, and increased daily feeding time by 14 per cent.

They also concluded that increasing feeding space to 1 m per cow allows subordinate cows to increase feeding activity at peak feeding times.

Although research done in 1977 showed that cows can be kept with as little as 0.2 m of feeding space per cow without adversely affecting DMI or milk production, it also showed that with such a small feed bunk space many cows may not be able to gain access to the feed at peak feeding times, forcing them to shift their feeding times to other parts of the day, including late at night.

According to Dr. DeVries from UBC, such a shift in feeding time may be roblematic for cows, because sorting of the TMR can reduce the quality of the feed for those who do not have access at the time fresh food is provided.

Their results indicate that providing more feeding space improves access to fresh feed, particularly for the subordinate cows, which possibly reduces the variation in diet quality consumed by the cows. This can potentially reduce the risk for metabolic problems such as subacute ruminal acidosis and left displatced abomasums. They concluded by recommending an increase on the feeding space over the current industry standard.

Effect of feeding space and feed barrier design on the feeding behavior of dairy cows

On a later date, the team from UBC did another study using different feed barrier designs, the use of a headlock barrier and a feed stall partition to see if this would provide additional protection while feeding, particularly for subordinate cows.

In this same study they also tested different feed bunk space/cow, 0.64 m and 0.92 m with just a post-and-rail feed barrier and 0.87 m feed bunk space but with feed stalls separating the cows.

Total daily feeding time increased and the frequency of aggressive interactions at the feed bunk decreased when more bunk space was increased from 0.64 to 0.92 m/cow confirming previous research. The addition of feed stalls resulted in even more pronounced effects compared with when cows had 0.92 m/cow of bunk space.

The average number of times a cow was displaced from the feed bunk that had feed stalls was only 45.5 per cent of the level seen for the 0.92 m treatment. According to this research as long as we have some kind of separation between the cows, like the feed stalls or the headlock barrier, the feeding bunk space can be reduced, allowing for a less costly building. The design of the feed stalls is detailed on p. 30.

This is very interesting research. Even if one decides not to increase feed bunk space or use feed barriers on every pen, a good place to start would be in the fresh and close-up cow pens.

Dry cows are very sensitive to overcrowding: an 11 per cent decrease in DMI was observed when numbers went from 88 to 93 per cent of capacity in a headlock pen, and early-lactation cows often experience difficulty in meeting their nutritional requirements and succumb to disease.

Steps to reduce lameness
Dairy Herd Management
10/9/2008

“Lameness is one of the key diseases from a welfare standpoint,” says veterinarian Gerard Cramer of Cramer Mobile Bovine Veterinary Services in Stratford, Ontario. Yet, failure to find lame cows and treat them early is an ongoing problem on many dairies. “We don’t find lame cows fast enough,” Cramer said last week during an educational seminar at World Dairy Expo.

Correct this problem by creating a lameness-management program that is specific to your herd. Make these components part of your program:

1.. Good records. Record cows that become lame and what lesions are present at routine hoof-trimmings. These data allow you to look across time and spot trends when troubleshooting lameness problems.
2.. Comfortable, clean and dry housing. This reduces standing time and exposure to manure which is the major source of infectious foot lesions like digital dermatitis and foot rot.

3.. Foot baths. Treat the claws on your cows' feet just as you would treat her teats. Use routine foot-bathing and spraying to protect a cow's feet from infectious lesions just as you use proper teat-dipping to control mastitis.

4.. Routine evaluations. Create a routine lame-cow detection and hoof-trimming schedule that allows you to evaluate and treat lame cows promptly.

5.. Minimize metabolic stress. Metabolic problems that lead to sub-acute ruminal acidosis also play a role in hoof horn lesion development.

6.. Teamwork. A team approach is necessary for making your foot-health management program work.

Preventing Early Lactation Mastitis
Dairy Site
January 9, 2009

There is nothing more frustrating than having a good (or bad for that matter) cow calve and get clinical mastitis during her period of peak production. Not only is it frustrating, it is also very costly, Jim Salfer, Extension Educator-Dairy, University of Minnesota Dairy Extension.

On a typical Minnesota dairy farm, total losses (decreased milk production, lower milk quality premiums, increased culling and death) from mastitis are about $200 per cow per year. Early lactation mastitis also affects reproduction. Research shows that cows with clinical mastitis before breeding remain open 44 days longer than cows without mastitis. The dry period is a very high risk period for cows to get environmental mastitis infections. Estimations are that over 60 per cent of all new infections actually begin during the dry period (Figure 1). This is certainly the situation with these early lactation mastitis cases.

Dry Off Strategies
Preventing early lactation mastitis infections begins with the dry off procedures. Historically the recommendation to dry off cows has been to abruptly cease milking and dry treat. When this recommendation was developed, cows were not milking as much as our current cows, now common to be more than 70 pounds at dry off. Newer research suggests that we should consider rethinking this strategy, especially with high producing cows. One study demonstrated that there was a 77 per cent increase in the risk of a cow calving with mastitis for every 11 pounds of milk per day above 28 pounds that a cow was giving at dry off. Two other factors that may cause early lactation mastitis are that high producing cows are more likely to leak milk, and they are slower to form the keratin plug in the teat, which provides the physical barrier to prevent pathogenic organisms from entering the mammary gland.

If possible, there is a real advantage to lowering milk production before dry off. In freestall barns, consider making a small "dry off" pen or in tie stall barns, build a small box in front of the stall. Then, cows can be fed separately a low energy diet such as grass hay. Milk production will drop dramatically within a few days. You can also consider the strategy of intermittent milking (1x per day) for a period of time before dry off. The ability to implement these strategies will vary depending on facilities, management and labor.

The standard recommendation that all cows receive an approved dry cow intramammary treatment at dry off continues. This helps to clear up any old infections and aids in the prevention of new infections during the early dry off period. A teat sealant should also be used. There are several external sealants (dips) and one internal sealant (OrbeSeal™) available. The major disadvantage of the dips is that they only stay on the teat for a few (4 to 6) days. OrbeSeal™ remains in the teat for the entire dry period. If used properly, these products have shown to reduce intramammary infections during the dry period 20 to 60 per cent.

Minimizing Environmental Challenge

Often dry cows and bred heifers are forgotten and neglected on farms. Dry cows require clean, dry, comfortable housing, especially during the first few weeks after drying off and the last couple of weeks before calving. Also, provide adequate bunk space and housing to minimize stress. In the summer, minimize heat stress by providing shade, fans and sprinklers.

Maximizing Immunity

All cows have decreased immune system function around calving time and are under increased stress because of calving—reasons cows are so susceptible to mastitis and other infections during this time. One way to minimize immune suppression is with good nutrition and feeding management. Work with your nutritionist to make sure cows have well-balanced diets containing high quality feeds. Also, provide adequate bunk and waterer space with high quality feed and clean water. Provide at least 28 inches of bunk space for pre-fresh cows and 36 inches of bunk space for fresh cows to encourage dry matter intake. Other factors that will minimize stress and encourage feed intake includes a comfortable, well-bedded environment with adequate resting space. Provide heat abatement and minimize grouping changes, especially the last three weeks before calving. Some herds are trying to create “all in - all out” close-up pens to minimize social disruptions around calving.

Work with your veterinarian to develop a vaccination program that maximizes immunity. Multiple doses of core antigen vaccines have been shown to decrease the incidence and severity of clinical coliform mastitis cases.

Conclusion

Most cases of early lactation mastitis begin during the dry period. By improving dry off strategies, minimizing the environmental challenges during the dry period, and strengthening the dry cow’s immune function, we can greatly decrease our early lactation clinical mastitis risk. This will result in greater profitability and less frustration.

Effect of mixing on calf behavior

Dairy Herd Management
January 12, 2009

Group rearing of milk-fed dairy calves may provide advantages in terms of labor, but it creates challenges in terms of calf management. Calves in groups may have to compete with group-mates for access to key resources, including milk.

Changes in social environments can have pronounced effects on the physiology and behavior of animals. Competitive interactions generally peak when new animals are introduced into a group, resulting in increased stress and reduced feed intake. Milk-fed calves in groups are often kept in dynamic groups, with new calves introduced soon after birth and older calves removed at weaning.

A study performed by Keelin O?Driscoll of the University of British Columbia reviewed the effects of mixing calves on drinking and competitive behavior in calves.

The objective of this study was to investigate the effect of mixing young calves on feeding and competitive behavior, following introduction into a group pen, when using a computer-controlled milk-feeding system.

In this study, eight Holstein calves were separated from their mothers within 24 hours of birth and moved to individual pens with milk supplied from an artificial teat. At approximately 11 days of age, calves were moved to individual training pens to acclimate them to the feeding system. The computer-controlled milk feeder was positioned between the individual training pen and a group pen. Each calf was housed in the training pen for seven days. After the training period, each calf was introduced into a different group of three non-experimental calves.

The study revealed that calves consumed, on average, more than 10 kilograms of milk per day, both before and after mixing. Consumption declined on the day that calves were mixed. The number of meals that calves consumed also declined on the day of mixing. Calves did appear to compensate for the reduced meal number at mixing by more than doubling their average intake per meal. These larger intakes were achieved, in part, by increased meal duration. However, unlike the other measures of feeding behavior, intake rate also remained high during the days after calves were mixed.

When competitive behavior was observed, the study revealed that other calves rarely contacted calves in the feeding stall. Likely, the presence of a milk-feeding stall provided some protection to the calves during milk-feeding events, as shown by the low number of aggressive interactions observed throughout the study.

For small groups of calves fed from a computerized feeder, mixing young calves has only transitory effects on feeding behavior. On the day of mixing, calves visit the feeder less frequently, but compensate by increasing the duration and amount of milk consumed per meal. More research is required to understand the effects of mixing when keeping calves in larger groups.

Tackling Dairy Cow Welfare Issues

Laura Boyle and Gabriela Olmos describe their work on elucidating the advantages of grass-based dairy systems from an animal welfare perspective, thereby increasing the competitiveness of the dairy industry. This article, a product of the Irish Agriculture and Food Development Authority, was published in the T Research magazine Volume 3, Number 3, Autumn 2008.

Dairy farming is relatively free of constraints imposed by animal welfare legislation, but this is likely to change in the future. Currently, the European Food Safety Authority (EFSA) is compiling a report on the welfare of dairy cows.

According to Professor Don Broom, Chairman of the EFSA dairy cow welfare working group, it is likely that an EU Directive on the welfare of dairy cows will follow. Such legislation could constrain the way in which cows are fed, managed and housed. Additionally, aspects of genetic selection could be restricted and pressure is likely to be

placed on milk producers to allow cows access to pasture. In most EU countries, cows are housed all year round, whereas in Ireland cows are at grass for between six and 10 months of the year.

In this respect, the Irish dairy industry could have a significant advantage over its European counterparts if legislation insisting on access to pasture is enforced. However, this does not mean that we can be complacent when it comes to dairy cow welfare, because cows in pasture-based systems can still suffer poor welfare. In light of future constraints on dairying practices, a proactive approach to cow welfare is crucial. Such an approach should involve an evaluation of the potential welfare implications of the technical innovations identified as important for the sustainability of dairying in Ireland. These innovations include:

1.. using genetic selection incorporating fitness and other traits relevant for cows in pasture-based systems of milk production;
2.. maximising utilisation and performance from grazed grass;
3.. developing low fixed-cost systems to allow dairy farmers to expand; and,
4.. developing labour-efficient systems of production.

At Moorepark, during a five-year research programme on dairy cow welfare, several aspects of these innovations were assessed. Dairy cow welfare was evaluated using a diverse range of measurements, encompassing behaviour, health (including mastitis and lameness), fertility, stress physiology and immune function. The range of measurements used reflects the challenges associated with measuring animal welfare; single indicators are inadequate to measure such a complex issue.

Genetic selection
In the past, genetic selection within the Holstein-Friesian breed was exclusively on the basis of milk yield and this had detrimental implications for fertility, health and, ultimately, for cow survival. The Irish Economic Breeding Index (EBI) attempts to address this problem by including traits such as survival, fertility and health, as well as selection for higher milk solids, the latter being more relevant than milk yield in grass-based milk production systems. For this reason, selection for high EBI genetics should result in cows that are fertile, show a low incidence of disease and that ultimately have good welfare and longevity in our milk production systems.

Lameness
After mastitis, lameness is the second most important cause of poor longevity in dairy cows. It is also the major welfare problem of dairy cows because of the pain it causes. Previous research at Moorepark showed that the average number of animals that became lame per six-month period (January to June or July to December) on 14 commercial dairy farms was between 12 and 16 per 100 cows. However, on individual farms, the figure could be as high as 31 per 100 cows during any six-month period, which indicates the extent of the problem. We evaluated indicators of lameness in cows from three genetic strains; two were classified as high EBI but had either North American (NA) or New Zealand (NZ) ancestry, and the third was of low EBI with NA ancestry. We found that, irrespective of their ancestry, higher EBI cows had equal or improved locomotion ability, less severe hoof disorders and less clinical lameness than animals of lower genetic potential.

Fertility, health and immune function

We also investigated fertility, health and immune function in these animals during the peripartum and early lactation period. During this time, dairy cows are particularly susceptible to poor welfare caused by stress and disease – ultimately leading to reproductive problems. Our studies indicate that high EBI cows tend to have lower somatic cell scores and fewer mastitis problems at calving. However, while disease and fertility outcomes were similar for high EBI cows of either NA or NZ ancestry, they had different physiological strategies for coping with the stresses associated with calving. Considering that the ancestors of these cows were selected in different environments (i.e., NZ=pasture vs. NA=confinement) and, hence, with different breeding goals, these differences could reflect inherited
peripartum adaptation strategies. A greater understanding of such differences will be required in order to avoid any deleterious effects arising from the use of high EBI genetics.

While the outlook for the EBI in terms of improving cow health is good, selection for high EBI could have an unforeseen impact on other correlated traits that influence cow welfare. For example, research conducted in the UK showed that dairy cows from sires that scored high for health, fertility and survival were more aggressive at feeding than cows from sires that scored low for these traits. In Ireland, to date, there has been no research on the effect of selective breeding on aspects of behaviour that influence cow welfare.

Maximising utilisation and performance from grazed grass In Ireland, the cheapest and most efficient way of producing milk is from grazed grass. The welfare advantages associated with this system of milk production compared to confinement-based systems are significant. Initial results from a trial conducted at Moorepark indicate that the prevalence of lameness in cows at grass was 17%, compared to 42% indoors, while the prevalence of mastitis was 35% in cows at grass, compared to 65% indoors. Furthermore, cows at grass showed better locomotory ability, lay down for longer and, ultimately, had fewer reproductive disorders compared to cows kept indoors. These findings help to strengthen the potential advantage Irish dairy producers will have over their European counterparts if legislation implementing access to pasture is enforced in the future.

Nevertheless, new strategies to maximise the utilisation of, and performance from, grazed grass in the diet could have negative welfare implications for dairy cows. We found that the hoof health of dry cows out-wintered on deferred grass was poorer compared to cows that were housed during the winter. Furthermore, we noticed deterioration in the hoof health of lactating cows that were at grass late in the autumn. There are several possible explanations for these findings. Firstly, extended grazing (where lactating cows are turned out early in the spring and are at grass for longer in the autumn) and, secondly, out-wintering dry cows on deferred grass means that animals are outside when the weather is poor in paddocks that are often unsheltered. This, combined with wet, muddy underfoot
conditions, deters cows from lying down. Prolonged standing is not only a major stressor of dairy cows but also contributes to hoof problems. Furthermore, exposure to high levels of rainfall can cause the hooves to soften, which makes them more susceptible to injury, particularly if the cows have to walk on muddy roadways. Clearly, strategies to maximise the use of grazed grass need to be developed, in conjunction with research on shelter options for cows at pasture, and alternative materials for farm roadways to minimise lameness.

Developing low fixed-cost systems
One of the main low fixed-cost systems evaluated at Moorepark and other Teagasc centres during the past few years, was out-wintering pads (OWPs). OWPs allow most classes of beef and dairy cattle to be kept outdoors during the winter in a free draining area on a bed of woodchips. Given the costs associated with cubicle housing for dairy animals, they are a key feature in the expansion of a dairy herd. As previously mentioned, keeping dairy animals outdoors during periods of bad weather has implications for welfare.

Our findings suggest, however, that (at least in the north Cork region) the risk of cold stress during the winter is minimal, although periods of wet and windy weather cause cows to spend less time lying down than they would in cubicles. Cows on OWPs also have softer hooves compared to animals indoors and this can have negative implications for hoof health once the cows recommence walking to and from the parlour for milking. However, we found little difference in the incidence of lameness during the winter period. In replacement dairy heifers, OWPs were also associated with behavioural indicators of good welfare, such as an increased incidence of play and comfort behaviours.

OWP heifers also suffered fewer leg injuries than heifers indoors. These benefits were attributed to higher space allowances and more comfortable underfoot conditions compared to cubicle accommodation. Certainly, when management is good, the woodchips are cleaned regularly and shelter is provided, OWPs have the potential to improve the welfare of dairy animals over conventional systems. This is good news for producers wishing to increase.

Developing labour-efficient systems of production
In Ireland, where herd sizes are increasing and there is a shortage of people willing to work on dairy farms, labour-efficient systems of production are crucial factors affecting expansion and sustainability. In the future, the EBI should help to ensure that dairy workers will not need to spend excessive amounts of time trying to get their cows in calf, in nursing them through illnesses or in treating lameness. This will contribute to improved labour efficiency on dairy farms. However, one area of concern is in the care of cows (and their calves) during the calving season. Grass-based milk production systems are characterised by a highly seasonal calving pattern, meaning that all the cows ideally calf within a few weeks of each other. However, unlike grass-based systems in New Zealand, where cows generally calve at grass with little or no supervision, calving in Ireland is highly managed, i.e., the cows calve indoors under supervision.
This, combined with increasingly large herd sizes and fewer labour units, means that the periparturient cow is likely to get less attention at a time when she is at her most vulnerable. There is likely to be a minimum below which the number of labour hours per cow per year cannot be reduced without welfare implications.

Once-a-day milking
A labour-efficient system of milk production that was comprehensively evaluated at Moorepark was once-a-day (OAD) milking. OAD milking is of interest to a niche group of farmers, particularly those with off-farm employment. The dairy cow welfare team worked together with researchers investigating effects on milk production, quality and processability, to determine the welfare implications of this practice. We found that, towards the end of the grazing season, hoof health in cows milked once a day was superior to that of cows milked twice a day.

We attributed this to the 50% reduction in walking to and from the parlour for milking. In early to peak lactation, however, OAD milking had some negative implications, as the cows suffered from discomfort caused by udder distension. This was reflected in abnormal locomotion, disturbed lying patterns, milk leakage and a detrimental effect on the functionality of cells of the immune system. Indeed, the latter finding suggests that there may have been some psychological stress associated with the practice. Cows will voluntarily enter automatic milking systems up to three times per day, suggesting that they 'prefer' to be milked more frequently, particularly in the period up to peak lactation.

Future
We are in an era of increased public awareness about farm animal welfare. Therefore, public acceptance of the breeding, feeding and management practices employed in the dairy industry is crucial. This, combined with tighter restrictions on dairying through EU animal welfare legislation, means that there will be a substantially increased need for work on dairy cow welfare in general and, particularly, on dairy cow welfare in pasture-based systems of milk production.

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PIGS

Non-Competetive Feeding Offers Advantages
December 29, 2008, farmscape.ca, Bruce Cochrane

Researchers with the Prairie Swine Centre report feeding systems like the one being used at its new sow research facility offer greater control over feed and reduced aggression during feeding. In June the Prairie Swine Centre officially opened its newly renovated 300 sow research facility at Floral, Saskatchewan. The group housing system uses what are decribed as walk-in lock-in feeding stalls. The stalls, which allow sows to enter and exit at will, segregate them from other sows during feeding eliminating competition for feed. Dr. Harold Gonyou says the system offers several advantages.Clip-Dr. Harold Gonyou-Prairie Swine Centre - I think the first thing is you're looking at a group housing system and group housing is something that we see the industry will be transitioning to over the next couple of decades because of public pressure or public desire to have pork from pigs that have been raised in a group housing system. So first of all it accomplishes that.

But the second point is that, in going to a group housing system, this approach of using the feeding stalls reduces one of the key concerns we have and that is control over feed intake. The sows in the system do not compete for feed. They will compete to get into a feeding stall but, once they're in there, they have their full allocation of feed. There's not competition for feed per say. One sow can not control the feed and prevent another sow from eating. Dr. Gonyou notes where sows are fed in a non-competitive manner, less

space is required per sow than in systems where animals have to compete for feed such as in floor feeding or trough feeding systems. He believes we need to be looking at group housing systems and at the management options available within those systems to come up with well based recommendations for how the sows should be managed.

Behaviour and Performance of Weaned Pigs
Tuesday, January 06, 2009
The pig site

US - From the University of Minnesota, Li and Johnston have published a paper on the behaviour and performance of pigs previously housed in large groups. They highlighted possible welfare issues when mixing pigs born to group-housed lactating sows. Body weight variation led to more aggression and injuries for the unfamiliar pigs.

A study was conducted to evaluate the effects of social familiarity and initial bodyweight (BW) variation at mixing on performance and welfare of pigs born to group-housed lactating sows.

A total of 180 pigs from 24 litters were used in a random design with 4 treatments in a 2 x 2 (social familiarity x initial BW uniformity) factorial arrangement. Pigs were born in group-farrowing rooms where they mingled in large groups of 66 to 80 pigs from 10 d of age. At 8 weeks of age (BW = 23 ? 3.1 kg), pigs were allocated to 20 pens of 9 pigs (5 castrated males and 4 females) in a grow-finish room, with five pens assigned to each of four treatment combinations without consideration of relatedness.

Familiar groups consisted of pigs from one farrowing room, and unfamiliar groups consisted of three pigs from each of three different farrowing rooms. Uniform weight groups were formed by using the middle two quartiles, and variable weight groups by using the heaviest and lightest quartiles of pigs.

Aggression and activity behaviour were directly observed by either scan or continuous sampling during a period of four hours on the first 3 days, day 7 and day 14 after grouping. Injury scores were assessed on all pigs immediately before and 48 hours after grouping. Weight gain and apparent feed intake were measured every 2 weeks for 14 weeks. Aggression in familiar groups was minimal throughout the observation periods.

Compared with that in familiar groups, total duration of fighting was greater in unfamiliar groups on day 0 (upon grouping, 48.5 versus 0.5 ? 10.88 s/pig(-1).4h(-1); $P<0.001$) and on day 1 (10.8 versus 0.4 ? 3.24 s/pig(-1).4h(-1); $P< 0.05$) after grouping.

Unfamiliar pigs had greater injury scores (6.6 versus 1.8 ? 0.28; $P<0.001$) and spent less time eating on day 0 (5.1 versus 8.8 ? 0.92 per cent of total observation time; $P<0.01$) after grouping compared with familiar pigs.

Average daily gain and average daily feed intake were lower in unfamiliar groups during the initial 6 weeks but not for the entire 14-week period in comparison with familiar groups.

Weight variation did not affect behaviour and performance in familiar groups but increased aggression-induced injuries in unfamiliar groups.

The results indicated that grouping unacquainted pigs derived from large groups induced overt aggression, associated injuries and initial reduction in performance, which causes welfare concerns on mixing pigs born to group-housed lactating sows.

Reference
Li Y.Z. and Johnston L.J. West Central Research and Outreach Center, University of Minnesota, Morris MN 56267. Behavior and performance of pigs previously housed in large groups. J Anim Sci. 2008 Dec 19. [Epub ahead of print]

Effect Of Age On Piglets' Behavioral And Physiological Responses To Tail Docking And Ear Notching
Source: December 31, 2008, aasv.org

Neonatal piglets are often subject to potentially painful processing procedures such as tail docking and ear notching during the first few days after birth. However, these procedures may influence the development of suckling behavior and passive transfer of immunoglobulins, especially if done within the first day postpartum. The objective of this experiment was to compare the effects of processing piglets during the first 24 h versus at 3 d of age on suckling and pain-related behavior, the passive transfer of immunoglobulins, and growth. Six piglets per litter from 20 litters (n=120 piglets) were used in a 3 x 2 complete block design. Piglets were weighed at birth and assigned to 1 of 3 treatments (balanced by birth weight): control (C; unmanipulated), sham processed (S; manually manipulated) and processed (P; tail docked and ear notched) at 1 of 2 ages (1 or 3 d-of-age).

Vocalizations were recorded during the procedures, and piglets were observed after the procedures for pain-related behavior. Suckling behavior was observed for 6 h on each of d 1 to 4. Colostrum samples were collected after the birth of all piglets (prior to first suck), and blood samples were collected on d 5 to examine levels of immunoglobulins (IgA and IgG) and insulin-like growth factor-I (IGF-I). Body weights were measured at birth and on d 5 and 14. During the procedures, P piglets, regardless of age, vocalized at a higher frequency ($P < 0.001$) and produced more high frequency calls ($P = 0.016$) than S piglets. All piglets on d 1 produced more high frequency calls than all piglets on d 3 ($P = 0.047$). Immediately after the procedures, S and P piglets spent less time lying and more time standing than C piglets ($P < 0.001$), whereas P piglets jammed their tail between their legs more than S or C piglets ($P < 0.001$). Lying, standing and tail posture were not influenced by age, nor were there age by treatment interactions. Piglets on d 1 trembled more than piglets on d 3 ($P < 0.001$), and this tended to be exacerbated by processing ($P = 0.076$). There was no effect of treatment or age of treatment on suckling behavior. P piglets had lower IgG serum concentrations than S and C piglets ($P = 0.029$), although there was no interaction between treatment and age of treatment ($P = 0.67$). While tail docking and ear notching do appear to result in short-term pain and modulated immune status, processing on d 1 appears neither better nor worse than processing on d 3.

Optimum Drinker-to-Pigs Ratio in the Nursery
The Pigsite
October 20, 2008
Original Source: Farms.com
More generous provision of drinkers tended to improve the growth of weaned pigs although the differences were not significant, according to research at Iowa State University reported by JoAnn Alumbaugh of Farms.Com. The work highlighted the need for more research into the effects on behaviour.

A study on the effect of pig ratio to cup waterers in a pen was performed by researchers at Iowa State University, in cooperation with Boehringer Ingelheim Vetmedica, Inc. (BIVI) and Cargill Pork.

The results of the study showed that pigs having access to three waterers in a nursery pen drank more frequently than those provided with one or two cup-waterers per pen. Additionally, there was a trend for pigs provided two or three cup-waterers per pen to have increased average daily gains, however these results were not statistically significant.

The recommended number of waterers for nursery pigs is one waterer for every 10 pigs. However, in general, pork producers in the United States tend to have one waterer for every 25 pigs. Because of this, the trial was set up using 25 nursery pigs per pen.

"When pigs were offered more places to drink, they visited the water bowl drinker more frequently over a 6-hour period, which tended to increase ADG in nursery-age pigs."

BIVI was interested from the standpoint of further understanding drinking behaviour as related to group vaccination via drinking water. "We investigated this with Anna Johnson's help a few years ago," says Roy Edler, Field Research Services Group Leader, for BIVI.

"You need to allow 4 to 6 hours for all pigs in a group to get an immunizing dose. We would hope that providing more water sources would increase the pig's opportunity to consume water and vaccine."

The importance of nursery system design, in regard to the impact of drinkers is limited, say the authors. "Previous work has addressed swine feeder placement and design. Therefore, the objectives of this study were firstly to determine the total number of visits made to a water bowl drinker by pigs over a 6-hour period and second, to calculate average daily gain when pigs were offered either one, two or three water-bowl drinkers per pen."

A total of 225 crossbred gilts weighing approximately 5.38kg (11.84lbs.) were housed in nine pens that provided for 0.22m2/pig (2.45 square feet per pig) in a commercial nursery facility near Jefferson City, Missouri. The research was conducted over six

weeks from October to December 2006. The nursery was equipped with side curtains providing the pigs with a natural lighting cycle.

Further studies will likely be designed for wean-to-finish units, since many operations no longer have traditional nurseries. Mr Edler explained, "There is the behavioural aspect of [these units] that has not been touched on yet, and this will be important."

Pigs were housed on plastic slatted flooring, and pens were separated using steel pipe gating (0.91m or 3 feet in height). Pigs had ad libitum access to a pelleted corn/soybean-based diet formulated to meet nutritional needs.

A total of nine pens were used for behavioural and performance measures. Three pens per treatment were compared, all using stainless steel waterers. Treatment one (T1) is defined as one water bowl drinker per pen. This provided one water bowl drinker per 25 gilts per pen. Treatment two (T2) was two water bowl drinkers per pen. This provided one water bowl drinker per 12 gilts per pen. Treatment three (T3) is defined as three water bowl drinkers per pen, providing one water bowl drinker per 8 gilts per pen.

Gilts were approximately 7 weeks of age when behavioural observations were recorded over a two-day period (15 and 16 November 2006). One day prior to visual recording, all pigs were identified with an individual number placed between their shoulder blades, using an animal-safe crayon.

Individual pig weights were taken at placement (day 0) and at exit (day 42) for calculation of average daily gain (ADG).

Total number of drinking visits over 6 hours differed between the groups, with T1 and T2 pigs having fewer total visits (10.32±0.95 and 10.60±0.84) to the water bowl drinker when compared to T3 (13.88±0.84).

Ending weights for pigs on trial were 23.78±8.13 kg. There were no differences (P=0.06) for ADG (0.41±0.03, 0.43±0.02 and 0.46±0.02) between treatments, respectively.

The authors report, "This study demonstrated that when pigs were offered more places to drink, they visited the water bowl drinker more frequently over a 6-hour period, which tended to increase ADG in nursery-age pigs."

Additional studies will likely result from this work. For example, one might consider the cost benefit of adding more waterers to increase average daily gain.

"Providing additional water access may improve the gain, it will require more research to determine the full value of adding more water lines, etc." says Mr Edler of BIVI.

"What is not demonstrated in this study is the behavioural aspects of providing more waterers. If you put more waterers in the pen, will it change the pen dynamics? Will the smaller pigs drink more often?

"The hypothesis is that by providing more waterers you increase the pigs' opportunity to have more waterer visits," he continues.

"Again, referring to the behaviour, does adding more waterers reduce aggressive behaviour and what does that do to the social dynamics within the pen? These are questions that require additional research."

Physical placement of the waterers is also important, says Mr Edler, and this factor would also have behavioural implications. "I think continuing to investigate the previously mentioned aspects will be worth considering, in addition to looking at water consumption patterns over time."

The authors of the original report were: Larry J. Sadler, ag. specialist; Jill R. Garvey, undergraduate; Tony J. Uhlenkamp, undergraduate; Ciara J. Jackson, graduate student; Ken Stalder, associate professor; Anna K. Johnson, assistant professor of animal science; Locke A. Karriker, assistant professor, VDPAM; Roy A. Edler and J. Tyler Holck, Boehringer Ingelheim Vetmedica, IA, USA; Paul R. DuBois, Cargill Pork, KS, USA.

Monitoring Deficiencies in Swine Diets

South Dakota State University Animal Scientists Chris Hostetler and Bob Thaler authored this publication: Monitoring Calcium, Phosphorous, and Vitamin D3 Deficiencies in Starter, Growing, and Finishing Pigs. http://agbiopubs.sdstate.edu/articles/ExEx2067.pdfSource: December 2008 , South Dakota State University/ Extension Extra, December 2008From Porknet

Due to the increasing cost of dietary ingredients, many swine producers are looking for the most cost-effective ways to meet the nutritional needs of their animals. One of the most costly ingredients in swine diets is inorganic phosphorus, which is normally supplemented as dicalcium phosphate. Calcium, phosphorus, and vitamin D3 each play a major role in bone formation, and a deficiency in these nutrients can lead to depressed growth, rickets, broken bones, and, eventually, paralysis in the hind legs. A lesser known syptom of calcium / phosphorous /vitamin D3 deficiency is the formation of large nodules, called rachitic rosaries, on the ribs of market hogs. In addition to being an indicator of improperly balanced diet, which could affect growth performance, rachitic rosaries pose a substantial problem for meat packers because of the loss in value incurred when these nodules are removed during processing, resulting in damage to the ribs, bellies, and sometimes even the loins of these animals. Grains are a poor source of calcium and available phosphorus, and rearing pigs indoors under artificial light has led to vitamin D3 deficiency. A calcium, phosphorus, and/or vitamin D3 deficiency leads to poor growth, decreased feed efficiency, and impaired skeletal development. Rachitic rosaries may be present in pigs with low to moderate calcium, phosphorus, and vitamin D3 status, and pose the threat of substantial loss in product value to the pork packing industry.

Impact Of Extra Care To Litters On Weaning Weight

This paper: Field trial to determine the impact of providing additional care to litters on weaning weight of pigs, Dewey CE, Gomes T, Richardson K. Department of Population Medicine, Ontario Veterinary College, University of Guelph. Can J Vet Res. 2008 Oct;72(5):390-5. Source: December 30, 2008, Atlantic Swine Research Partnership/ Newsletter,

The purpose of this field trial was to determine if maximal care of pigs from birth until 16 d of age would result in a significant alteration in the survivorship and growth performance of the pigs compared with control pigs born in the same time period. Sows were randomly assigned to treatment group prior to farrowing. Control pigs received the standard, commercial farm care. In maximal care litters, pigs were dried off at farrowing, given a rubber mat in the creep area, and given electrolytes, chilled pigs were warmed and given colostrum or glucose, surgical instruments used for processing were dipped into an antiseptic between pigs, the castration wounds were sprayed with iodine, and sows were fed 3 times rather than twice a day. Pigs that received the maximal care weighed 170 g (+/- 80 g) more at 16 d of age than standard care pigs. Factors that reduced weight at 16 d included having a low birth weight, nursing a gilt or a parity 5-6 sow, nursing in a large litter, being clinically ill or being lame after 3 d of age, being cross-fostered and nursing an ill sow. In general, maximal care did not reduce mortality. Providing maximal care did improve weaning weights and enabled small birth weight pigs to reach 3.7 kg at 16 d of age.

Amino Acid Boosts Litter Size and Piglet Growth

Research at North Carolina State University shows that feeding extra arginine to young sows during pregnancy and lactation can increase litter size and piglet growth, writes Jackie Linden, editor of ThePigSite.

Arginine is an essential amino acid and, as Dr Sungwoo Kim of North Carolina State University explains, "It plays multiple roles in animal metabolism by serving as a substrate for protein synthesis, as in intermediate in the hepatic urea cycle, and as a precursor for the synthesis of various metabolic molecules, including nitric oxide (NO) and polyamines."

These multiple roles make arginine particularly interesting to Dr Kim, whose focus is researching the role of amino acids in sows and neonatal pigs. He has recently joined the Swine Nutrition Group at North Carolina State University.

He says that other researchers have found nitric oxide to play a vital role in enhancing blood flow during pregnancy in ewes, which helps to deliver more nutrients to the developing embryos. Polyamines are involved in the earliest development of the embryo (embryogenesis) as well as the growth of the placenta, which delivers nutrients to the embryos.

Dr Kim found that porcine amniotic fluid, which surrounds the developing embryos - contains an unusually high concentration of arginine (4-6mmol/litre)

This discovery led Dr Kim and his colleagues to a study to see what effects additional arginine in the diet would have on reproduction in pigs. Using 52 pregnant gilts, they fed half of the animals an extra 1% arginine from days 30 to 114 of gestation. The results are shown in Table 1.

They found that the supplemented group had two extra piglets born alive (11.40 versus 9.37 for the control). The difference was statistically significant (P<0.05) The piglets born (both in total and born alive) tended to be heavier were heavier and more even in size in the group of gilts fed extra arginine.

These promising results led to a follow-up experiment with 38 sows in their first parity. The trial was a 2x2 factorial design, with two diets in late pregnancy (from 30 days of gestation to farrowing) and in lactation: these were an unsupplemented control diet or one with an extra 1% arginine hydrochloride).

The author notes that piglets whose dams received the extra arginine during lactation gained about 20g more weight per day during the 21-day lactation (P<0.05) than those fed the control diet.

It is interesting to note that although supplemental arginine in the lactation diet had a significant effect on the bodyweight of the piglets, these parameters also benefitted from supplementation during the sow's pregnancy. The effects of extra arginine during the two periods tended to be additive despite piglet birth weights being similar for all treatments.

The extra arginine did not affect the sows in terms of bodyweight changes, back fat, feed intake or the days taken to return to oestrus.

"Collectively," Dr Kim concludes, "results from this study indicate the beneficial effects of dietary arginine supplementation in improving the lactation of first-parity sows."

Further Reading
- You can view the full report in Swine News from North Carolina State Swine Extension

Preparing a Farrowing Arc
The Pigsite
October 6, 2008

A well prepared and organised farrowing paddock will make outdoor sow and piglet management easier and more productive, advises BPEX.

Providing the correct environment for both sows and piglets in the farrowing arc will help to minimise mortality and maximise growth rate of piglets and maintain the sow in good condition ready for the next cycle.

Equipment Required	Personal Safety
• Straw • Cable ties • Spade	• Dust mask

- Tools for repairing

Preparation
After weaning:

- Move the hut to a fresh piece of ground within the farrowing paddock and either burn the original bed or remove from the paddock
- Weather permitting leave the hut upside down so that the inside is exposed to sunlight
- These two procedures are referred to as “tip and burn” and they reduce disease incidence
- If appropriate wash and disinfect the hut
- Repair any broken or damaged areas of the hut to reduce the risk of physical injury to the sow and/or piglets and of chilling as a result of holes and draughts

Outline of the Work
Before the sows are moved into the farrowing paddocks:
Remove any large stones from inside the arc and check it is situated on a fresh piece of ground
Consider ventilation, season and prevailing wind direction when deciding which direction the hut should face
Place wads of dry wheat straw (or chopped barley straw) in the hut
Placing the wads on the ground of the intended hut site before you tip the hut back over will save time
If there are any ruts under the hut dig these in to reduce draughts, this involves spreading soil over the gaps between the ground and the hut
Place the fender near to the hut, unless drop front fenders are used in which case these can be attached and the front dropped
Check the back vent to ensure that it is still in place after moving the hut and adjust according to the weather
Double check the water provision and fence lines before the sows are moved into the farrowing paddocks

- If there is variation between the size of huts try to allocate gilts and smaller sows to the smaller huts

Prior to farrowing:

- Check the back vent and adjust according to current weather conditions
- Check the bed prior to the expected farrowing date; if straw levels have reduced add some more, but not too much
- If the bed is uneven, flatten out the straw
- Check again for draughts and plug any holes with straw or dig soil over them
- Check when to attach the fender and any door curtains with your line manager
- If the fenders do not fit properly use cable ties to ensure there is a flush fit between them and the hut

Further information

The Code of Recommendations for the Welfare of Livestock (Pigs) has specific recommendations for pigs kept in outdoor husbandry systems including:

Farrowing pens where sows are kept loose must have some means of protecting the piglets, such as farrowing rails
Farrowing arcs should be sited on level ground to reduce the risk of overlying. Suitable restrainer boards should be used to prevent very young piglets from straying during the post-farrowing period
Farrowing arcs should be insulated and have provision for some degree of extra ventilation such as manually controlled flaps.

Keeping Pigs Healthy During a Stressful Show Season
The PigSite
September 2008
From Pfizer Animal Health. Preventing disease is always better than treating disease.

"Preventing disease is always better than treating disease," says James F. Lowe, DVM, MS, Carthage, Illinois. "You want to keep your show pigs healthy and growing," he says. "It is imperative to pay attention to their health by working to help prevent disease and keep it from slowing down your road to the show ring." There are two completely different types of products to keep your pigs healthy: vaccines and anti-infectives (or antibiotics).

Vaccines
Prevention is provided by vaccines and a good biosecurity program. You can do two things: administer vaccines to help protect them, and reduce the pathogen challenges to which your pigs are exposed. Work with your veterinarian to develop an appropriate vaccination program.

Vaccines are used to stimulate immunity to help pigs fight a bacteria or virus when they are exposed. Commercially available vaccines are created to help protect pigs from specific strains of bacteria and viruses.

Most pigs are vaccinated when they are young because it sometimes takes weeks for the pigs to respond to the vaccine and build up enough immunity in their system to fight a disease challenge. Thus, pigs need to be vaccinated several weeks before they are moved or mixed with other pigs when they might come in contact with the disease-causing agent. In the same way you received several childhood vaccinations and booster shots, your parents and your doctor made sure you had your vaccinations before you went to school and were mixed in with other kids and exposed to disease.

It is very important to work with your veterinarian and to read and follow label directions when administering vaccines. Many vaccines require a second dose or booster shot. Often those two doses must be administered at specific intervals to create good immunity.

Biosecurity
A good biosecurity program starts by isolating or physically separating pigs and observing them for a period of time before they re-enter the herd. Pigs taken to a show should be kept by themselves for about a month to determine if they are going to

become sick. If they have been exposed to a disease, you might be able to contain the problem to only those pigs that traveled if they are properly isolated. A good isolation rule to follow is keeping pigs separated by at least 300 feet (90 metres) away for 30 days.

Limit traffic on the farm to only necessary vehicles. You should also wash and disinfect the hog trailer after each show. Take out all the shavings and take the trailer to a local car wash to be cleaned with hot water and soap. Any equipment that is transported to the show, including feed pans, water pails, brushes, panels etc., should be washed and disinfected after each show.

Keep your show equipment in a separate part of the barn and do not use it for chores at home. You can purchase disinfectant from your veterinarian or your local farm store, or make your own by putting an ounce of household bleach into a gallon of hot water. Sunshine aids in killing bacteria so let your equipment dry completely in the sun if you can.

Disease Pressure
Most swine diseases are passed by pig-to-pig contact. The stress of transportation, mixing and moving your pigs from show to show can put stress on your pig's immune system or its ability to fight disease. Mixing pigs next to other pigs and moving them around from your farm to a show can create a condition where the pig could get sick. It is important to watch your pigs closely for signs of disease after a show. It's important to minimize the risk of disease by doing as much as you can to reduce the stress on your animals and by reducing their exposure to disease.

Anti-Infectives
Even with all the best preventive measures, pigs sometimes get sick and need treatment. Anti-infectives (or antibiotics) may be needed to fight the bacteria that make pigs sick and get your pigs back to a healthy, growing condition again. Anti-infectives do not work on viruses, but do work on the opportunistic bacterial infections that come in after the pig is compromised by a virus. Not all antibiotics work on all bacterial infections, so choosing the right one is crucial.

Anti-infectives work quickly to kill the bacteria that are making the pig sick. Some of these products are broad-spectrum treatments that may treat more than one bacterium at the same time. For example, one long-acting, single-dose product such as Draxxin® (tulathromycin) Injectable Solution is the only product that treats the five most common bacteria that cause respiratory disease in pigs: Actinobacillus pleuropneumoniae, Pasteurella multocida, Bordetella ronchiseptica, Haemophilus parasuis and Mycoplasma hyopneumoniae. Draxxin has a five-day pre-slaughter withdrawal time. More information is available on the web site (see below).

Work with your veterinarian to determine the proper dosage of each product to be given and to make sure that the antibiotic is right for your pig. In the same way you would not take antibiotics for an infection without consulting your physician, be sure your pigs are getting the proper dose for their weight and age.

Another important factor to remember is administering a full course of treatment. Some products seem to be effective after one shot; others may take a follow-up dose to help

your sick pig regain its health. Your pigs may appear to be getting better and then relapse if they are not given the full course of treatment.

Withdrawal Times
Be sure to work with your veterinarian to know the proper withdrawal times before slaughter. Both vaccines and anti-infective products have publicized withdrawal times or days from the time you administer the product to when your pig may be slaughtered.

The only way to be sure you are using animal health products properly is to read and follow all directions on the product label and to work with your veterinarian.

Late Introduction of Sows and Gilts to Farrowing Environment
ThePigSite News Desk
September 30, 2008
DENMARK - Pedersen and Jensen of the University of Aarhus have carried out research that indicates no adverse effects on the progress of farrowing or maternal behaviour when older sows are introduced late to farrowing pens but gilts had more stillborn piglets.

To evaluate the effect of late introduction to farrowing pens on the progress of farrowing and maternal behaviour, 20 primiparous and 20 multiparous sows were allocated randomly to one of two treatments: 1) early introduction to pen (EP; n=20) and 2) late introduction to pen (LP; n=20). To evaluate the difference between loose-housed sows and crated sows when introduced late to the farrowing environment, a third treatment was included: late introduction to farrowing crate (LC; n=20).

Sow behaviour and piglet birth intervals were recorded using video recordings from 16 hours (h) before the birth of the first piglet (BFP) until 48 hours after BFP. Behavioural data were analysed using PROC MIXED in SAS and the percentage of stillborn piglets and the response of the sow to piglet scream were analyzed using PROC GENMOD in SAS.

Before farrowing (16 to 3 h before BFP), sows introduced late to pens had more postural changes per hour than sows introduced early to pens (LP=12.7; EP=8.9; P=0.04), whereas there were no differences between sows introduced late to crates and sows introduced late to pens (LC=14.2; LP=12.7; P=0.53).

Interbirth interval (P=0.04), variation in the interbirth interval (P=0.01), and percentage of stillborn piglets (P=0.003) were affected by an interaction between parity and treatment. In multiparous sows, there were no differences between treatments (P>0.18) either in the progress of farrowing or in the percentage of stillborn piglets. For primiparous sows, there were no differences (P>0.22) between sows that were introduced late to pens and sows that were introduced early to pens.

Primiparous sows that were introduced late to crates compared with pens had longer interbirth intervals (LC=29 ± 4.9 min; LP=16 ± 2.9 min; P=0.02), a greater variation of these intervals (LC=35 ± 8.3 min; LP=16 ± 3.6 min; P=0.006), and a greater percentage

of stillborn piglets (LC=21%; 95% confidence interval ranging 14 to 30%; LP=5%; 95% confidence interval ranging from 2 to 12%; P=0.004).

After farrowing, neither postural changes, time spent in lateral lying, number of near-crushing situations, nor the response to piglet scream test were affected by treatment (P>0.09).

When sows and gilts were introduced late to farrowing pens, neither progress of farrowing nor maternal behaviour of importance for piglet crushing was influenced. However, crating primiparous sows that were introduced late to the farrowing environment compared with pen housing had detrimental effects on the progress of farrowing and the percentage of stillborn piglets.

Reference
Pedersen L.J. and T. Jensen. 2008. Institute of Animal Health, Welfare and Nutrition, Faculty of Agricultural Sciences, University of Aarhus, 8830
Tjele, Denmark. J. Anim Sci. 2008. 86:2730-2737. doi:10.2527/jas.2007-0749

Effect of Space Allowance on Gilt Performance
Source: October 28, 2008 , Atlantic Swine Research Partnership/ Newsletter, Oct. 28, 2008

A total of 1,257 gilts were used to determine the effect of space allowance during rearing and age at puberty on total pigs produced and removal rate over 3 parities. There were two treatments. In treatment 1, gilts were given a space allowance of 1.13 m2/gilt (15 gilts per pen), and in treatment 2, gilts were given 0.77 m2/gilt (22 gilts per pen). Gilts (38 kg and 75 d of age) were individually weighed upon entry and before leaving the rearing site. They were scanned for backfat thickness and loin depth and had their feet and legs scored for structure, movement, and toe evenness before leaving the rearing site. Commencing at approximately 140 d of age, gilts were exposed to a vasectomized boar once daily with age of puberty recorded for all gilts attaining puberty before leaving the rearing site. Gilts were then moved to a specialized gilt breeding farm. When confirmed pregnant, they were moved to 1 of 9 sow farms at random, where gilts remained until removal from that herd. Space allowance in rearing had no effect (P > 0.29) on growth rate in rearing, backfat thickness and loin depth, total pigs produced, or removal rate. A greater percentage of gilts attained puberty (P = 0.02) and attained puberty at a younger age (P < 0.01) when given the greater space allowance in rearing. Gilts given the lower space allowance in rearing had more (P = 0.04) cracks on their rear hooves. Gilts attaining puberty at a younger age (<185 d) had a greater growth rate in rearing, greater backfat thickness at 200 d of age, and produced more (P < 0.05) pigs over parities 1 to 3. Gilts in the fastest growth-rate group in rearing (>860 g/d) had greater (P < 0.05) total born in parity 1, but total pigs produced to the end of parity 3 was not different (P = 0.47). Contrary to expectation, a fast growth rate in rearing did not negatively affect removal rate. Gilts served between 240 to 260 d of age produced more (P < 0.01) pigs by the end of parity 3 than those served at >260 d of age, whereas a greater (P < 0.01) percentage of gilts served at >280 d of age were removed by the end of parity 3.In conclusion, space allowance in rearing did not affect total pigs produced or

removal rate; however, gilts that attained puberty at a younger age produced more pigs over parities 1 to 3.

"Effect of space allowance during rearing and selection criteria on performance of gilts over three parities in a commercial swine production system," M. G. Young, M. D. Tokach, F. X. Aherne, S. S. Dritz, R. D. Goodband, J. L. Nelssen and T. M. Loughin. Department of Animal Sciences and Industry, Kansas State University, Manhattan 66506-0210; and Alberta Pig Company, 9189 Lockside Drive, North Saanich, British Columbia, Canada, V8L 1N2; and and Food Animal Health and Management Center, College of Veterinary Medicine, and and Department of Statistics, Kansas State University, Manhattan 66506-0210 J. Anim Sci. 2008. 86:3181-3193. doi:10.2527/jas.2007-0600

Processing Piglets Properly

Improving well-being during piglet processing: time is what matters most, writes Ed Pajor for Pork Information Gateway.
The Pig Site
November 4, 2008

There is growing public concern over the well-being of farm animals. Piglet processing involves routine procedures that are often criticized as causing pain, stress and decreasing animal well-being. However, there is little scientific information on the magnitude of this stress or if alternatives to the standard procedures improve piglet well-being.

Picture: National Pork BoardRecent research by Dr Jeremy Marchant-Ford and colleagues at the USDA-ARS Livestock Behavior Research Unit and Purdue University has determined that processing techniques that can be carried out quickly and with minimal tissue damage is likely to be the least stressful for the piglet.

The researchers compared alternative techniques such as teeth grinding, hot-ron tail-docking, ear tagging and oral dosing of iron to teeth clipping, cold tail-ocking, ear notching and iron injecting.In most cases, the alternative techniques were found to be more stressful as indicated by higher cortisol levels, higher and more frequent vocalizations, and poorer growth rates.

The one exception was that ear tagging did appear to improve piglet well-being over ear notching. Ear tagging resulted in less tissue damage and was done more quickly.

Ensuring that stockperson are well trained to carry out piglet processing procedures is a key component to minimizing the time required to perform procedures and improving the well-being of piglets.

Swine Vet Center – Needle Free Injection

Source: Chase CCL, Daniels CS, Garcia R, et al. Needle-free injection technology in swine: Progress toward vaccine efficacy and pork quality. J
Swine Health Prod. 2008;16(5):254–261/ SVC Staff, Nov. 5, 2008.
Source: November 5, 2008, Porknet

This article is an evaluation of the current literature available regarding the use of Needle Free Injection Devices (NFID's). Although NFID's have been used in humans since the 1930's, their implementation in the swine industry has been slow due to the low cost and ease of syringe-needle use. With the initiation of Pork Quality Assurance standards regarding broken needles along with concerns of injection site bacterial contamination and the risk of spreading infectious agents among groups of pigs, interest in needless technology has increased. From an immunologic standpoint needless technologies have also been encouraged as the immunology research indicates that when immune-activating dendritic cells in the skin and subcutaneous tissues are targeted, there is an improved immune response among pigs.There are three different types of needle-free devices: Spring-loaded jet injector, battery-powered jet injector, and gas-powered jet injector. Most of the vaccine trials have used gas-powered jet injectors. The advantages to using NFID's include: the elimination of broken needles, consistent vaccine delivery, lower vaccine volume, higher antigen dispersion, elimination of worker needle sticks, less pain and stress, and elimination of needle disposal. In all of the studies comparing NFID to needle-and-syringe vaccinated pigs, the NFID vaccinated pigs had an equivalent or better immune response. Some of the disadvantages include: higher start-up costs, higher requirement for training and maintenance, infrastructure for exhaustible gas systems, no one-size-fits-all NFID, and worker confidence in NFID. The cost of the equipment for swine NFID's range from $2500 to $3000 and there are additional maintenance costs, compressor and CO2 tank expenses.

SVC Thoughts:
1. As stated in the article, NFID's require only ½ to 1/10th of the dose of vaccine required for intramuscular injections to elicit a similar immune response to needle injected vaccine; although, optimal NFID doses for many swine vaccines have not yet been determined. This is due to the increased antigen dispersion and antigen contact with the antigen-presenting cells (such as dendritic cells). Decreasing the amount of the vaccine used while increasing the immune response of the pigs would have its obvious advantages.
2. One of the disadvantages mentioned in the article is that there is no one-size-fits-all NFID, so differences in size/age of the animals, injection volumes, and viscosity of injection solutions will likely require different pressure settings and maybe even different devices. This would add to the cost of the already expensive system but could easily be standardized for a farm or production system.
3. From a safety standpoint, this device is a great alternative to the needle and syringe system, as it would eliminate the risk of needles in the meat and worker needle sticks.
4. Further studies are necessary to determine the efficacy of these devices in the field. Additionally, further engineering may be necessary to develop a device that can be easily operated by anyone and is effortlessly maneuvered through a swine barn.
5. It should also be mentioned that lowering the pig to pig spread of viruses like PRRS within a group of pigs would also be an advantage for this technology.

Pregnancy Housing Affects Offspring Performance
Sow stalls are much criticised by animal welfare groups although a 2004 review showed no evidence of any harm to sows in a well managed confined housing systems. New work from Virginia Tech, summarised for ThePigSite by editor Jackie Linden, shows that there are long-term effects on the female offspring of sows kept in individual stalls or groups during pregnancy.

"An exciting and growing body of scientific evidence supports the notion that the maternal environment in which foetuses develop plays a profound role in the development of the reproductive and other physiologic systems," write Drs Mark J. Estienne and Allen F. Harper of Virginia Tech's Tidewater AREC (TAREC) in the September 2008 issue of *Livestock Update*.

They explain that foetal programming refers to the process by which an acute or chronic stimulus in the uterus establishes a permanent response in the foetus that impacts physiological function later in life.

The concept of foetal programming in pigs was illustrated by O'Gorman and colleagues in 2007. They found that age at first oestrus was significantly delayed (by 14 days) in the female offspring of sows that had been subjected to stress during pregnancy.

Previous work by Estienne and colleagues at TAREC showed that the pregnancy rate was higher for gilts housed in individual stalls (100%) than group-housed individuals (85.7%) although the stress level appeared to be higher in the gilts kept in stalls. They measured stress as the concentration of cortisol in the blood serum.

For their latest trial, Drs Estienne and Harper put forward the hypothesis that if there is a real difference between housing systems (individual stalls versus group pens) in terms of 'stress' or welfare of the sow, then foetal programming would lead to differences in growth and reproductive performance of the offspring. They looked at the growth and age a puberty of the female offspring.

Experimental Details
The researchers used Yorkshire x Landrace gilts mated by artificial insemination (AI) and allotted to one of three types of gestation housing:
individual stalls throughout pregnancy
group pens throughout pregnancy (5 to 6 gilts/pen) or
individual stalls for 30 days post-mating and then group pens for the remainder of pregnancy.
From then on, all gilts and their offspring were treated the same way, keeping the treatment groups separate. From weaning at about 25 days of age, the gilts were separated from the barrows. After 5 weeks in the nursery, the groups of gilts were transferred intact pens to the grower-finishing barn until they weighed around 240lbs (109kg). At this stage, their backfat thickness was measured. Records were kept at each stage of the animals' weight and feed intake.

After the grower-finishing phase, the gilts were checked for oestrus once daily in the presence of a boar and age at puberty, i.e. first standing oestrus in the presence of the boar, were determined. Ten days later, all gilts were killed and their reproductive tracts were evaluated.

Findings
There were no effects of dam pregnantly housing on litter size, although there was a tendency for a greater average number of pigs born alive for treatments 1 and 3 (11.8 and 11.4, respectively) compared to 9.2 piglets for treatment 2.

The body weights of the piglets were similar at birth, weaning and the end of the nursery phase.

Some differences between the groups emerged during the growing-finishing period, as shown in Table 1. Overall, average daily gain was not affected by treatment. However, the pattern of pig growth was affected by housing of the dams: the offspring of gilts from treatment 1 weighed more during the last two weeks of this phase than the other treatments.

There was no effect of treatment on feed intake but feed conversion was significantly better (P<0.05) in gilts from treatments 1 and 3 than treatment 2. Pigs from treatment 1 tended (P<0.09) to have less back fat than those from treatment 2, with treatment 3 being intermediate.

Table 1. Grower-finishing performance of gilts farrowed by sows kept in different housing systems during preganancy

Parameter	1 Stalls	2 Pens	3 Stalls/Pens
Number of Pens	9	9	9
Daily gain, lbs	2.21	2.11	2.11
Feed intake, lbs/day	5.76	5.75	5.55
Feed/gain	2.60 a	2.73 b	2.62 a
Back fat thickness, mm	10.9 c	12.5 d	12.1 c,d

a,b Means with different superscripts differ (P<0.05)

c,d Means with different superscripts tend to differ (P<0.09)

Investigations of the reproductive tracts showed that the average weight of ovaries (P=0.07) and the weight of follicular fluid (an indication of follicle number and/or size; P=0.08) tended to be greater for gilts from treatment 2.

Dam housing type during pregnancy did not affect the number of corpora lutea (an indication of ovulation rate), average size of corpora lutea or uterine weight.

The average age at puberty was similar for all the groups. However, for the period between 151 and 165 days of age, fewer (P<0.05) gilts from treatment 1 had reached puberty than the other two groups.

Around 60 per cent of sows in the US are kept in individual stalls throughout pregnancy. The restricted freedom of movement is strongly criticised by animal welfare groups on the basis that this type of housing is stressful although a comprehensive review of the scientific literature concluded that well-managed stalls or group pens generally produce similar states of well-being for pregnant sows in terms of physiology, behaviour, performance and health.

This is the first report of the effects of the dam's housing during pregnancy on the performance of the offspring.

It illustrates that the type of housing to which pregnant gilts are exposed affects the performance of gilt offspring. Although there were no effects during the lactation and nursery phases, gilts farrowed by sows gestated in stalls grew faster than the other treatments during the late finishing phase. Gilts from females kept in stalls throughout

pregnancy were leaner at market weight.

Gilts from dams housed in groups had larger ovaries, greater follicular development, and reached puberty sooner than did those from dams housed in stalls throughout pregnancy. In general, reproductive characteristics of gilts from dams that spent the first 30 days of pregnancy in stalls and were then moved to group pens were intermediate between the two other groups.

Drs Estienne and Harper conclude, "The type of housing to which pregnant gilts are exposed affects subsequent growth and reproduction in female offspring perhaps through a phenomenon referred to as foetal programming.

"In general, gilts farrowed by females kept in stalls during gestation grew faster and were leaner at market weight but displayed delayed puberty."

Although the mechanisms responsible are not yet known, the work provides further evidence of the concept of foetal programming, and may help producers considering a switch from individual to group housing in pregnancy.

Reference:
Estienne M.J. & A.F. Harper, 2008. Effects of type of sow gestation housing on growth performance and reproduction in gilt offspring. Livestock Update, September 2008.

Handling and Restraining Pigs
ThePigSite
November 11, 2008

All stockmen that handle and restrain pigs should be shown the correct techniques relevant for the size/age of the pig. Correct handling and restraining a pig will reduce the risk of injury and stress to both the pig and stockman. This article from BPEX offers helpful practical tips.

Equipment Required
Personal Safety

Safe handling area
Suitable pig board
Snare, if restraining older pigs for treatment
All livestock can be unpredictable.
Only competent staff should handle and restrain pigs.
Suitable protective clothing

Preparation

Before restraining a pig for treatment ensure:

· All the required equipment is ready to use

· The equipment is easily accessible once the pig is restrained.

Young Pigs (up to 10 kg)

Outline of work – moving piglets (by lifting them)

· Lift the pig by a back leg, taking care not to ‘snatch’ or ‘swing’ the piglet as you lift it

· Support the chest with your other hand, when moving with the piglet over any distance to avoid undue pressure on the leg joints

· Lower the piglet back to the ground, ensuring both front legs have contact with the surface

· Then gently lower the back legs to the floor and release your grip

· Only lift one piglet at a time in each hand.

Never pick a piglet up by their ear - this can cause ear haematomas - or by a front leg or tail

Outline of work - restraining/handling for inspection

· Lift the piglet by the back leg

· Place your other hand under the chest of the piglet to provide support (Figure 1)

· Lift the piglet and hold so that it is horizontal (Figure 2)

· Hold the piglet firmly to minimise the piglet’s ability to move

· Alternatively after lifting, place the piglet over your forearm with the chest in the palm of your hand and the legs hanging either side of your arm.

Older Pigs (over 10 kg)

Preparation

· When moving pigs, ensure the way forward is clear, secure and obvious to the pigs

· When moving pigs, ensure that the pigs are moved from dark to lighter areas with no shadows

· When restraining pigs, ensure the area will not pose a risk of injury to pig or stockman ie nonslip floor, flat sides, clear of distractions etc

· When restraining pigs ensure the required equipment for task is ready and immediately available to you in the handling area.

Outline of work – Moving growing pigs, sows and boars

· Move the pig in a calm, unhurried manner

· Allow the pig to walk to its destination at its own pace at all times

· The pig can be encouraged forward by use of a pig board and voice

· Do not kick the pigs or use sticks/prods to directly hit the pigs

· Pigs should only be encourage forward, when the way ahead of them is clear.

Certain pieces of equipment, e.g. electric goads, are banned by Assurance schemes.

Outline of work - restraint

· Ensure the area is large enough to perform the task safely, but small enough to restrict movement, e.g. at the end of a passage way or specific handling crate

· Ensure the pig cannot move forward

· Apply gentle pressure with the pig board/your leg to the hind-quarters and flank of the pig to keep them still

· Treat the pig as quickly as possible, and return to its pen promptly.

Restraining using a snare

If the task will take a long time, e.g. to lance an abscess, the use of a restraining snare or snatch may be necessary to provide adequate restraint. They should only be used when absolutely necessary, and the person snaring should be trained and competent at this activity. The snare/snatch should be designed specifically for the purpose of restraining pigs and kept clean and hygienic.

Outline of work

· Set up the area of restraint as above

· Control the pig's movement with a pig board

· The size of the snare loop should be relevant to the size of the pig being restraint

· Place the snare loop in the mouth and over the top jaw and snout of the pig, with the snare handle held vertically in the other hand

· Move the loop as far back in the mouth as possible before tightening it

· Hold the snare securely

· A second person can then perform the required task

· Release the pig as soon as possible by smoothly loosening and releasing the snare and then return the pig to its pen

· Pigs should not be restrained by snatching for prolonged periods.

· Do not attempt to move the pig by pulling the pig by the snare

· Pigs should not be tied up by the snare.

Solving Tail-Biting Problems
The PorkSite
November 11, 2008
From Pork Information Gateway. Todd See gives an overview of the environmental, management and nutritional causes of tail-biting.

Outbreaks of tail-biting occur in intensive pork production when a pig bites or chews on another pigs tail leading to a wound and bleeding. This abnormal social behaviour is usually associated with deficiencies in the pigs environment, management or nutrition.

To solve a tail-biting problem promptly remove and treat the tail-bitten pig(s). Then review the following questions and determine the most likely causes. If tail-biting continues check other likely causes until the problem disappears.

Environmental Causes of Tail-Biting
a.. Is the building temperature appropriate for the age and weight of the pigs?
b.. Is the ventilation system functioning properly?
c.. Are pigs following appropriate dunging behavior?
d.. Is the building air quality (ammonia and hydrogen sulphide levels) satisfactory?
e.. Are pens dry?
Management Causes of Tail-Biting
a.. Are pigs overcrowded?
b.. Can pigs lie comfortably?
c.. Has mixing of pigs between pens occurred?
d.. Is the electrical supply properly grounded and stray voltage eliminated?
Nutritional Causes of Tail-Biting
a.. Was the feed properly formulated for levels of salt and other vitamins and minerals?
b.. Are there a sufficient number of drinkers with adequate flow rate per pen?
c.. Is there adequate feeder space?

Controlling Stillbirth Losses
The Pig Site
November 17, 2008
Hypor offers solutions to this global problem, including tips on management and supervision at farrowing.

In general, as total litter size has increased, there has been a tendency for an increase in the percentage of piglets born dead. It is now quite common to see an average stillbirth rate of 1.0 piglets per litter, or even more, in data from individual farms and herd recording schemes. This presents an opportunity to improve weaning capacity by reducing the level of stillbirths through a sound genetic program and good management procedures.

The Hypor genetic program includes selection for numbers born alive per litter, in addition to total numbers born, which makes a significant contribution to keeping stillbirths at a reasonable level. A focus on litter size alone presents the risk of lowering birth weights and decreased uniformity. Litter size and piglet quality traits tend to be negatively correlated. Focusing a breeding and selection program on a single trait would indirectly push other negatively correlated traits in an undesirable direction.

Birth weight is a trait that plays a major role when we consider piglet quality and survival. Traits like average birth weight and total birth weight have relatively high heritabilities, 0.25 and 0.15, respectively. Small piglets (weighing less than 800 grams) and non-uniform litters also have high heritabilities, meaning there is the potential for genetic improvement. Traits such as number of small piglets and uniformity of litter at birth have a heritability of 0.10 and 0.07, respectively.

Good Management is Vital

Applying the correct management procedures before and during the farrowing process can also have a major impact. A reduction of 0.3 in the number of stillborn pigs per litter, which is relatively easy to achieve on most farms, will result in about 1.4 more piglets weaned per sow lifetime and an increase in weaning capacity of nearly 10kg.

Stillbirths are defined as those piglets that die during the farrowing process because their placental blood supply through the umbilicus is restricted or cut off by the contractions of the uterus and therefore they are asphyxiated. There are a number of factors that influence stillbirth rate, most of them related to the sow and the farrowing process. Parity has the biggest effect because stillbirths increase steadily after the second litter and are highest in sows of parity 6 or more. Sows that produce large litters tend to have more still born piglets and also those that have had one or more stillbirths in a previous litter have an increased risk in subsequent litters.

Stillbirth rate is closely related to the time taken to farrow, which is usually in the range 2-5 hours, although most sows farrow within 2-3 hours. A longer farrowing time is associated with higher stillbirths because the risk of umbilical blood flow being disrupted increases over time. The other major factor involved is the stage of farrowing, because almost all stillbirths occur in the last third of farrowing and 70% in the last three piglets.

In order to make most effective use of time when managing farrowing, the sows that have the highest likelihood of producing stillborn pigs (based on parity, previous history) should be identified and a note made on their farrowing card. This allows greater attention to be given to the highest risk sows, resulting in more effective management.

Supervision

Supervision of farrowing is essential in order to have a significant impact on stillbirth rate and, in most cases, this will require a high percentage of farrowings to be induced. Prior to commencement of this practice, it is important to know the average gestation length for natural farrowings for the herd as a whole and also by parity, because this varies from farm to farm. In order to maximize birth weights, induction should not be carried out too soon relative to the average gestation length.

The Guidelines

The following management procedures can be used to minimize stillbirth rate:

· Once farrowing has started, observe the sow quietly and note the time, number of liveborn piglets and number of stillbirths on the farrowing card each time the sow is checked. Technicians should be well trained in understanding farrowing behaviour so that they can identify and respond to any abnormalities or problems quickly.

· In the earlier stages of farrowing, assistance is rarely needed and unless the sow is having difficulties, or appears uncomfortable, she should be left to farrow on her own.

· When a sow has had 6-7 piglets, assistance should be given when about 20 minutes has elapsed without a piglet being born, or if a stillborn piglet is born. This time can be adjusted, if necessary, on the basis of experience.

· Good hygiene procedures should be observed when assisting sows, including washing the vulva area with warm water and a mild antiseptic and using arm-length plastic gloves lubricated with obstetric gel. Sows that have been assisted should also be given an injection of long-acting antibiotic, following the farm's treatment protocol.

· Technicians should look for the telltale presence of yellow-brown meconium, or piglet faeces, in the sac that surrounds the piglet. This is excreted when piglets are deprived of oxygen in the uterus. If it is seen, it is a good indication that there is a problem and the sow should be assisted immediately.

· When sows are assisted, all piglets that can be reached should be carefully pulled out. Piglets should have any membranes around them removed, be assisted to breathe if necessary, placed under a heat lamp and later assisted to suckle colostrum.

· If farrowing is slow or the sow stops contracting, Oxytocin can be used sparingly to stimulate uterine contractions, once it has been checked that the cervix is clear of obstruction. A maximum dose of 0.5ml or 5 International Units (iu) should be given intramuscularly or, if directed by the farm veterinarian, 2.5 iu injected into the vulva. Administration of oxytocin may be carried out every 20-30 minutes if required. But using too large a dose of oxytocin may cause the uterus to 'lock up', leading to more stillborn piglets.

· After a sow has been assisted, she should be closely observed until farrowing is complete and assisted again, if necessary.

Work by Scottish researcher Dr Peter English has shown that when these measures are taken to reduce stillbirths, they also result in an increase in the survival rate of pigs born alive. This is because the incidence of anoxia, or oxygen starvation, which is the primary

cause of low viability, is reduced. Herd records show clearly that those herds with a low stillbirth rate have the lowest pre-weaning mortality.

Other Factors

In addition to management of the farrowing process itself, other management and environmental factors can influence stillbirth rate.

Overfeeding in the 3-4 days prior to farrowing can lead to increased stillbirths, so it is advisable to reduce the feed allowance to 2.0kg/day for sows and 1.8kg for gilts. Excessively high farrowing room temperatures, which result in discomfort for the sow, are also associated with higher stillbirths and the room temperature at farrowing should be 21-22°C where possible. Any situation that results in the sow being stressed or uncomfortable may result in increased stillbirths. In particular, it is very important that staff act in a quiet and calm manner when sows are farrowing because noise and disturbance will lead to stress.

The Hypor Solution

Hypor has made efforts to take into consideration the animal's biology while defining the breeding goals. This has led to more balanced breeding goals that fit naturally in the future breeding pig. Where we foresee biological limitations, we include those factors in the breeding goal.

Another area that Hypor breeding goals address is the maintenance of traits within sensible ranges. This avoids having traits fall out of a reasonable biological range and having to start fixing them after the fact. An example would be a trait like age at first mating. Breeding perpetually for reduced age at first mating can result in gilts that start cycling before they are physically strong enough to support pregnancy and lactation without negative effects. Consequently our breeding goal is to 'optimize' age at first mating and such other traits like interval weaning to mating.

Ultimately the focus in selection is to create more quality piglets with a high total litter weight. Having 15 quality piglets of 1.5kg average birth weight adds up to 22.5kg litter weight. This can only be achieved as a target when piglet quality and birth weights do not get compromised too much while selecting for litter size.

A balanced genetic focus combined with correct management procedures during farrowing will help to realize the genetic potential for high numbers born alive in Hypor sows and gilts. By increasing the number of piglets weaned per litter and consequently the weight of piglets weaned per sow lifetime, attention to stillbirth management can make a valuable contribution to maximizing weaning capacity.

Husbandry Practice To Improve Piglet Welfare
Source: November 26, 2008, thepigsite.com

US - USDA researchers have studied how best to perform various husbandry procedures on piglets in order to minimise stress to the animals and improve welfare. The aim of this study by Marchant-Forde and colleagues at Purdue University was to

evaluate stress responses evoked by two alternative methods for performing the following processing procedures: teeth re-section (TR) - clipping versus grinding, tail-docking (TD) - cold versus hot-clipping, identification (ID) - ear notching versus tagging, iron administration (FE) - injection versus oral and castration (CA) - cords cut versus torn. Eight to 10 litters of eight, 2- and 3-day-old piglets were assigned to each procedure. Within each litter, 2 piglets were assigned to 1 of 4 possible procedures: the 2 alternative methods, a sham procedure, and a sham procedure plus blood sampling.

Blood was sampled before processing and at 45 min, 4 hours, 48 hours, 1 week and 2 weeks post-procedure and assayed for cortisol and beta-endorphin. Procedures were video-taped and analyzed to evaluate the time taken to perform the procedure and the number of squeals, grunts and escape attempts. Vocalizations were analyzed to determine mean and peak frequencies and duration. Piglets were weighed before the procedure and at 24 hours, 48 hours, 1 week and 2 weeks afterwards. Lesions were scored on a 0 to 5 scale on ID, TD and CA pigs at 24 hours, 1 week, and 2 weeks post-procedure. For TR, grinding took longer than clipping and resulted in greater cortisol concentration overall, poorer growth rates and longer vocalizations compared to control treatment pigs ($P<0.05$). For TD, hot clipping took longer and hot-clipped piglets grew slower than cold-clipped piglets ($P<0.05$). Hot clipping also resulted in longer and higher frequency squealing than control pigs ($P<0.01$). For ID, ear notching took longer than tagging and ear-notched piglets had worse wound scores than tagged piglets ($P<0.05$). Cortisol concentrations at 4 hours also tended to be greater for notched piglets ($P<0.10$). Ear notching evoked calls with higher peak frequency than control treatments. For FE, oral delivery took numerically longer than injecting, but there were no significant differences between injecting and oral delivery in any of the measures. For CA, tearing took longer than cutting the cords ($P < 0.05$) but beta-endorphin concentrations at 45 min post-procedure were greater for cut piglets. Using measures of behaviour, physiology and productivity, the responses to TR, TD and ID can be shown to be altered by method of procedure whereas responses to FE and CA did not differ. The time taken to carry out the procedure would appear to be an important factor in the strength of the stress response.

Reduced Vet and Culling Costs Offset Higher Manure Management and Labour Costs in Straw Based Group Swine Housing
by BruceCochrane (Dec 09, 2008) Farms.com

Research underway at the National Centre for Livestock and the environment suggests higher manure handling and labour costs in straw based swine housing may be offset by reduced veterinary costs and lower culling rates.

Researchers with the University of Manitoba's Faculty of Agricultural and Food Sciences have been comparing sows raised in conventional slatted floor systems to those raised in groups housed on straw since 2006.

As well as evaluating differences in the manure produced in the two systems, scientists are monitoring the performance and welfare of the sows.

Animal science professor Dr. Laurie Connor reports culling rates have been higher in the conventional system as a result of higher leg and joint problems.

Clip-Dr. Laurie Connor-University of Manitoba
What you would see of course is that, in terms of operational costs, is that because the one is on straw and the other isn't that you have the straw component which is going to cost a bit more.

The straw system also does require slightly more labour because it needs to be cleaned out more with a front end loader.

However we have nothing near the medications or drug costs in that particular facility and so, in some ways, they start to balance out both in terms of the time that needs to be spent in administering those medications as well as the extra costs of the drugs.

I'm sorry, I don't have any actual dollars and cents at the moment.

This is something that, for this past two years, we are hoping to have actual figures totaled up and some good comparison by early next year. Dr. Connor says, considering the many factors involved, including manure management and labour, it's still too early to make strong recommendations one way or the other.

She notes a web page is under development which will outline some of the things producers should look at when they consider going to group housing.

She hopes that resource will also be available in early 2009.

Sows Housed On Straw Out Perform Those On Slatted Floors

Source: December 18, 2008, farmscape.ca, Bruce Cochrane

Research conducted by the University of Manitoba indicates, from an animal welfare perspective, sows housed in groups on straw tend to out perform those housed in conventional slatted floor systems. Research at the University of Manitoba's National Centre for Livestock and the Environment is comparing sows housed in conventional slated floor facilities to those housed in groups on straw. The two groups use the same genetics and are managed similarly. Animal science professor Dr. Laurie Connor says scientists are tracking longevity, joint health, lameness and body condition scores as well as culling rates, litter sizes, born alives, deads and weaning weights.

Clip-Dr. Laurie Connor-University of Manitoba - We do tend to get a slightly larger litter size, similar born alives but slightly different in weaning numbers, weaning weights, slightly more from the group that have been from sows that have been on straw throughout all of gestation. In terms of culling of the sows, in the conventional system more sows are culled within the same period of time, most often associated with leg problems, joint problems, not so much in terms of things like body condition. We're able to keep the animals in very similar condition in the two facilities. One of the problems, the most obvious from an economic standpoint, aside from having to replace more in the conventional barn is that we have to medicate more of those animals, the sows in

particular, very often again associated with leg injuries, things associated with the complete slat
floors in groups. Dr. Connor says the straw based system requires straw and additional labour but those costs may be offset by reduced medication and culling costs. She notes it is too early to make specific recommendations but further details of the work will be made public by early 2009.

Swine Vet Center – Effect of Weaning Age

Source: Davis ME, Sears SC, Apple JK, Maxwell CV, Johnson ZB. Effect of weaning age and commingling after the nursery phase of pigs in a wean-to-finish facility on growth, and humoral and behavioral indicators of well-being. J Anim Sci. 2006 Mar;84(3):743-56/ SVC Staff, Dec. 18, 2008.
From Porknet

In the US, wean age is quite variable with the youngest wean ages around 12 or 14 days and some of the oldest wean ages around 28 days. This study was designed to compare some different management practices utilized in the US: weaning at a young age (14 days) versus weaning an older pig (21 days) and commingling pigs after the nursery phase versus leaving the original nursery groups intact. Pigs from one farrowing group of gilts were weaned either at 14 days or 21 days of age and divided into younger and older groups (108 pigs per group) and penned 12 pigs per pen in a wean-to-finish facility. At the completion of the nursery stage, half of the pigs in each age group were removed, re-randomized, and commingled for the finishing phase; the rest remained in their original pens. Blood samples were obtained on days 0, 2, 10, 27, 37, 44, and 65 after weaning to determine leukocyte concentrations. The study was completed once the lightest weight block averaged 107 kg (235.4 lbs). Behavior was also monitored at weaning, day 7, 14, and 27 (during the nursery phase) and on days 35, 38, 44, and 65 (during the grow/finish phase). The older pigs were heavier ($P < 0.001$) throughout the nursery stage; the body weight difference between the older and younger pigs increased from 2 to 6.5 kg at the beginning and end of the nursery period respectively. The older pigs had a greater concentration of white blood cells and lymphocytes on the first three blood tests post weaning than the younger pigs. The younger pigs spent less time resting on weaning day and more time active during the overall nursery phase, suggesting that the younger pigs were slower to habituate to their new environment than were older pigs. During the overall nursery phase, the pigs weaned at 21 days of age had a higher Average Daily Gain (ADG) and Average Daily Feed Intake (ADFI) ($P < 0.01$) than the pigs weaned at 14 days. During the overall finishing phase, the younger pigs had greater ADG ($P < 0.01$) and G:F than the older pigs. Additionally, the ADFI decreased ($P < 0.05$) when the older pigs were commingled compared with the older pigs that were not commingled.
The younger pigs did not experience a difference in ADFI regardless of commingling. As indicated by the results of this study, weaning age does have an effect on growth performance, behavioral and immunological responses to weaning and commingling after the nursery phase.
SVC Thoughts:
1. Although there is weaning age variation in the US swine industry, there has been a shift to older weaning ages for several good reasons, including decreased belly nosing and other behaviors associated with appetite, decreased post-weaning mortality, increased intestinal development and increased production.

2. In this study, the pigs weaned at 14 days overcame a deficit in body weight to reach a common body weight at the end of the nursery period in fewer days than pigs weaned at 21 days of age. As mentioned in the article, this is an atypical result, as most studies have shown either no effect of weaning age on overall gain from birth to market or an increase in ADG during the nursery and grow/finish phases with increasing weaning age.3. During the nursery phase, the mortality rate was increased in the younger weaning age group compared to the older group in this study. All of the deaths during the nursery phase were pigs showing signs of Streptococcus suis. This may be due to a less developed immune system compared to the older group.
4. Some genetic companies have also looked into weaning age and have formulated weaning age recommendations based on downstream production numbers to get the most out of your pigs.
5. Older wean age is not only beneficial for grow/finish but it almost always pays for itself in improved reproduction (increased farrowing rate and total born) as well as improved efficiency in the breeding barn.6. Age is only part of the U.S. industry's problem today. Weaning weight variation is increasing. On a typical 19-20 day wean, there are often pigs ranging from 6-20 lbs.

Rethinking sows; It may be human nature to want the sows which produce the most piglets, but that might not be most profitable.

Ontario Farmer
Wed 03 Dec 2008
Page: 4
Section: News
Byline: BY JOHN GREIG

Is the era of highly prolific sows over?

If researchers have their way it will be. And I expect many producers and those who work in farrowing rooms will be happy enough as well.

Those who chase the coffee shop numbers may be the only ones disappointed.

The bottom line is that years of breeding for more pigs in the womb has only meant smaller piglets being born, with fewer being born alive.

In the hotbed of sow prolificacy, in France, it's a sad chore for those in the farrowing room to remove buckets of dead pigs. Lots of piglets come out of the sow, but stillborn levels are too high.

That's likely to be an animal welfare issue, says Dr. George Foxcroft of the University of Alberta. He's become a leading advocate for more complex approaches to piglet production.

He recognizes that a sow has to produce a lot of piglets, but he's part of a large group from around the world doing research which is tracing the effects of large litters right back to early gestation.

They've traced the amount of muscle fibre a pig will have as a market hog right back to factors at day 90 of fetal development.

Researchers have made elegant correlations between brain and liver development. Crowded fetuses will protect their brain development by pulling nutrition from the development of their body, and their future ability to gain muscle. That means slower gain and more days to market.

The genes are there for fantastic production, say Foxcroft. We just haven't found the perfect conditions to allow those genes to express their full potential in a commercial setting. After all, not every sow and piglet can have personalized treatment and be coddled and protected from germs their whole life.

Genetics companies are already moving to select against stillborns, while trying to maintain high piglets per sow.

It goes against human nature to want fewer piglets per sow, but it looks like it goes against profitability, and the welfare of the animals as well.

Lessons from Germany; Animal welfare issues are an increasing challenge for German hog farmers
Ontario Farmer
Wed 03 Dec 2008
Page: 8
Section: News
Byline: BY JIM ROMAHN

Germans could teach Canadian hog farmers a thing or two. And two of them were at the annual swine industry seminar in Shakespeare recently to do exactly that.

The Germans have learned through trial and "a lot of mistakes" how to raise hogs in free-stall conditions, said Dr. Friedrich Osterhoff of Ahrhoff GmbH of Boenen, Germany, a company that runs a feed mill and hog farms.

They have also learned how to have high performance and health without antibiotic or hormone growth promoters.

Feed conversions are running around 2.6 kilograms of feed per kilogram of hog, he said.

Another major difference is that all German hog farms practice batch farrowing, he said. It reduces labour, improves the number of pigs weaned per sow and makes all-in, all-out disease-reducing management possible.

He said sow groups need to be at least 15, and preferably 30 or even more. At 10 or less, there is fighting, he said.

A typical farm runs five to seven groups per sow herd, he said. The one disadvantage is needing more sow crates - 20 per cent more for a four-week batch system, 29 per cent more for a three-week batch system.

Litters are equalized at 12 to 13, he said. Batches farrow within two to three days.

"We only have a couple of busy days per month," he said.

The German hog-packing companies make so many excellent sausages that per capita pork consumption is 55 kilograms per year.

The Pietrain-breed is popular as a terminal cross, he said, more popular than Durocs. The Germans have imported some of Canada's best Durocs.

One of the most popular sow barn designs is open-ended crates. The sows are free to roam in a wide aisle, then enter a crate to feed.

A gate closes to keep her in and other sows out while she eats. And she will usually rest in the crate, sometimes for many hours, often all the time, Osterhoff said.

"Of course, when the inspector comes, the crates are all open," he said with another chuckle echoed by the audience of about 90.

Osterhoff has helped to organize 15 trips over the last 10 years for 300 German farmers to scrutinize the Canadian and U.S. hog industries. He said Ontario suits them better because the scale of farms closely resembles Germany's farms.

They find it's harder to learn anything useful from the large U.S. operations, he said.

One big thing they learned in North America was the value of segregated weaning setups.

Hans-Peter Witt, who farms 950 hectares and raises about 28,000 market hogs per year near the North Sea and border with Denmark, told how two women inseminate 100 sows within an hour or an hour and 10 minutes. Any sows that fail to catch are culled unless their track records are strong enough to warrant another chance.

Many of his sows are outside, even in winter weather that can dip to -15 C. Their watering nipples are beside the barn, under a tin roof and behind a curtain of plastic strips; it has never frozen.

He said castration is emerging as a major animal welfare issue. The Germans have tried and reject antibody injections and carbon-dioxide anaesthetic. Neither is allowed by the government, although they are legal in other countries such as Switzerland and Australia.

Pain killer injections seem likely to become the solution when current castration practices are banned, Witt said.

That costs 10 to 15 Euro cents (15 to 18 Canadian cents) per pig.

Witt also outlined how compulsory state-run insurance programs operate, covering losses when a "named" disease wipes out a herd. Many farmers buy additional voluntary

insurance to cover additional diseases and losses related to quarantine zones embracing a healthy herd.

There are 15 million Euros ($23 million) in the fund now, so premiums have been suspended, Witt said.

Give loose housing some thought ; The trend is to loose housing, but economics will mean it will take a while
Ontario Farmer
Wed 03 Dec 2008
Page: 22
Section: News
Byline: BY MURRAY ELLIOTT

Over the last 10 years in finishing production there has been tremendous change to our housing design. We have gone from pens of approximately 25 pigs to loose barns housing up to a thousand head as a group, Even more amazingly we have done this with with no cost to the important production parameters.

Feed conversion, daily gains and mortality have either improved or remained static with these dramatic housing changes. Admittedly we are on design 3.0 and the early barns with food courts and almost no penning were not friendly to the operators. It has brought us to a barn design that gives us all the benefits of a pen-type facility with more flexibility and labour requirements that are less physically demanding and by luck more humane. As our customers view our production methods this is going to be one of our considerations in barn design,

Three years ago both Smithfield and Maple Leaf Foods gave us 10 years to replace our dry sow stall housing units. To be fair to these packers their customers gave them the same type of mandate.

The EU has passed a law that by 2013 dry sow stalls are not allowed. The consumer is ultimately telling us, and this is world wide, that our present animal rearing practices are not acceptable and we must change.

We can and will whine and complain and justify our existing production methods, I know I do, but deep down I also know I will lose this battle and have to adapt to a loose sow housing design. It will either be consumer demand, packer demand, legislation or fear of non tariff trade barriers that make me give in. Canadian pork production needs exports as we are all to painfully aware.

The bright side is I believe that we will be just as successful as the loose housing of finishing hogs that we as producers developed without anyone pushing us. Pigs are a herd animal, they like being in groups. Not every animal or every type of system is better than stalls from a animal welfare point of view, but that is the point we have to remember. Our customers want stalls gone, we have to maintain our excellent production standards and develop a loose sow production system that is humane.

It appears we will be allowed to use stalls for the first 35 days post breeding, This should be non-negotiable on our part. We must have the control stalls give us to get the girls

bred, preg checked and in good body condition. After this I believe we currently have two viable options for reaching our goals by renovating our existing facilities.

They are electronic sow stations and good old fashioned floor feeding with automated feed drops. I have seen both these systems used successfully for many years. In a new barn situation the freedom type stalls are also an option that gives the best of all worlds. These require more square footage than a current barn has and are therefore available for new construction situations or possibly an existing herd that would downsize.

I priced out two renovation options for a standard Ontario stall barn converting to loose sow. A floor feed type system would cost approximately $170 a sow space and a electronic sow system approximately $400. There is a web site with some general information and barn designs, just type in VIDO in your search engine and enter loose sow housing in the search box to access it.

We obviously need our profit picture to improve dramatically before we do anything, I believe by May we will be printing black ink regularly, In the meantime when you're plowing or power washing or whenever you do your best thinking, rattle this around in your head.

We have lots of time and it's probably not going to earn you a premium price, so there is no hurry. At the same time, it's a massive undertaking to convert all the existing sow space in North America to loose sow housing so give it some thought, because it is coming.

Improvement in Conditions for Group-Housed Sows
The PigSite
Friday, December 12, 2008
DENMARK - Different aspects of farrowing systems for group-housed sows and their offspring were featured at an international workshop.

Piglet mortality for group-housed sows was no larger than for confined sows.
The main risk factors affecting piglet mortality were low body temperature and birth weight. (Photo: Lene Juul Pedersen, DJF)For many years it has been common practice to confine sows in crates when farrowing to save space and time. It has also been assumed that this would prevent the sows from crushing their piglets. In later years there has, however, been increasing pressure from consumers and organisations for sows to remain untethered. The alternative housing of sows in larger farrowing pens leads to new challenges and requirements for knowledge.

To this end, a number of scientists and other professionals from universities and research institutes in Denmark, England, Scotland, Norway, Switzerland, Sweden and Austria were gathered at an international workshop to share and exchange their knowledge and experience.

Among the Danish participants were senior scientist Lene Juul Pedersen from the Department of Animal Health, Welfare and Nutrition at the Faculty of Agricultural Sciences (DJF), Aarhus University. She presented her research results on piglet mortality and design of farrowing systems for penned sows and their offspring.

Piglet mortality is highest immediately following birth, but there were no significant differences between systems using crates and systems with group-housed sows. She found that the microclimate in the farrowing pen had a larger influence on piglet survival than whether the sows were crated or not.

With the objective of creating a farrowing pen that optimises piglet survival and welfare and also the welfare of the sows and farm workers, Lene Juul Pedersen has been working with Vivi Aarestrup Moustsen from Danish Pig Production on devising different designs of farrowing pens for group-housed sows. This work has resulted in some principles for the design of farrowing pens and new prototypes for pens that will be tested in practice.

At the workshop the concept of group-housed sows and their piglets was illuminated from different angles, including breeding, management, behaviour, economy and its practical application in pig production.

Why Do Pigs Die During Commercial Transportation?

Source: December 11, 2008, thepigsite.com

EU - An international team of scientists, led by Spain?s Luis Fernando Gos?lvez, has carried out a study in five European countries to identify and evaluate the factors involved in causing injuries or even death in pigs as they are transported to abattoirs. The results show that the stress and suffering the animals undergo would be reduced if more time was spent on loading them properly onto trucks and the temperature was kept down. The researchers from the University of L?rida (UL) and the University of Bristol in the United Kingdom are in agreement that the death of pigs during transportation must be considered from the perspective of animal welfare as well as the economic losses caused to the livestock sector. ?Of the 112,842 pigs that were transported in Spain between June 2003 and May 2004, 121 were dead upon arrival,? Luis Fernando Gos?lvez, lead author of the study and chair in the Animal Production Department at the UL, told SINC. The study, which has been published recently in Veterinary Record includes statistical analysis applied to a model of logistic regression in the transport of pigs at 37 abattoirs throughout five countries in the European Union: Spain (403 journeys), Portugal (169), France (65), Italy (57) and Germany (45). According to the study, the pigs? country of origin has no affect on their risk of mortality. The researchers ascertained the deaths and injuries suffered by the pigs, in the form of bruises and wounds, by conducting interviews with lorry drivers. Animals were bruised in 8.5 per cent of the journeys. Gons?lvez says the risk of death would decline if more time was spent on loading each of the animals properly, including restraining them inside the lorry. The study confirms that animals were not tied up during transit in more than one quarter of the journeys. The Spanish and British scientists also looked at other factors affecting the pigs. The air temperature experienced during travel is crucial, since pigs respond negatively and their stress levels rise in line with increasing heat. The study stresses that ?pigs should not be transported during the hottest hours of the day?. Other factors, including the use of electric prods to make the animals move, gender differences, the lack of bedding or ventilation, lack

of water to keep them hydrated, and the number of stops during the journey ?could also cause stress?.

POULTRY

NETHERLANDS: Beetle may spread salmonella and campylobacter in broilers
28.nov.08
Farmers Weekly Interactive
Richard Allison

Dutch research suggests that one type of beetle and their larvae could carry over salmonella and campylobacter from one broiler flock to the next.The darkling beetle (Alphitobius diaperinus) and its larvae are known to inhabit broiler houses and are believed to survive between rearing cycles by eating their way into insulation materials and hiding under floors.In the study conducted by Wageningen University and Research Centre, Lelystad, The Netherlands, researchers artificially contaminated several groups of beetles and their larvae with a mixture of S enterica and three C jejuni strains.

These were then fed to housed broiler chicks either the day of inoculation or one week following to mimic an empty week between rearing cycles.All the broiler chicks that were fed insects contaminated on the same day showed campylobacter and salmonella colonisation levels of 50-100%. Insects that were fed a week after infection resulted in transfer of both pathogens as well, but at lower levels.

Welfare assessment of laying hens in furnished cages and non-cage systems: an on-farm comparison
Authors: Rodenburg, T.B.; Tuyttens, F.A.M.; de Reu, K; Herman, L.; Zoons, J.; Sonck, B.
Source: Animal Welfare, Volume 17, Number 4, November 2008 , pp. 363-373(11)
Publisher: Universities Federation for Animal Welfare

Abstract:

From 2012 onwards, all laying hens in Europe will need to be housed either in furnished cages or non-cage systems (aviaries or floor-housing systems). In terms of animal welfare, furnished cages and non-cage systems both have advantages and disadvantages. Data on direct comparisons between the two, however, are limited. The aim of this study was to carry out an on-farm comparison of laying hens' welfare in furnished cages and non-cage systems.
To meet this aim, six flocks of laying hens in furnished cages and seven flocks in non-cage systems (all without an outdoor run) were visited when hens were around 60 weeks of age and a number of measures were collected: behavioural observations, fearfulness, plumage and body condition, incidence of bone breaks, bone strength, TGI-score (or Animal Needs Index), dust levels and mortality. In non-cage systems, birds

were found to be more active and made greater use of resources (scratching area, perches) than in furnished cages. These birds also had stronger bones and were less fearful than birds in furnished cages. On the other hand, birds in furnished cages had lower mortality rates, lower incidence of bone fractures and lower airborne dust concentrations. When all the welfare indicators were integrated into an overall welfare score, there were no significant differences between systems. These results indicate that furnished cages and non-cage systems have both strong and weak points in terms of their impact on animal welfare.

Commercial Poultry Lack Genetic Diversity, Are Vulnerable To Avian Flu And Other Threats
ScienceDaily:
Science News

ScienceDaily (Nov. 12, 2008) — As concerns such as avian flu, animal welfare and consumer preferences impact the poultry industry, the reduced genetic diversity of commercial bird breeds increases their vulnerability and the industry's ability to adapt, according to a genetics expert.

Purdue University animal sciences professor Bill Muir was part of an international research team that analyzed the genetic lines of commercial chickens used to produce meat and eggs around the world. Researchers found that commercial birds are missing more than half of the genetic diversity native to the species, possibly leaving them vulnerable to new diseases and raising questions about their long-term sustainability.

"Just what is missing is hard to determine," Muir said. "But recent concerns over avian flu point to the need to ensure that even rare traits, such as those associated with disease resistance, are not totally missing in commercial flocks."

He said it's also important to preserve non-commercial breeds and wild birds for the purpose of safeguarding genetic diversity and that interbreeding additional species with commercial lines might help protect the industry.

The research was led by Hans Cheng of the U.S. Department of Agriculture.

Historically, chicken producers selected birds for breeding based on certain desirable traits. Size was important for broilers, while egg production was critical for layers. Despite the fact that hundreds of chicken breeds exist, Muir said today's commercial broilers descend from about three lines of chickens, and poultry used in egg production come from only one specialized line.

The research team included government, university and industrial scientists who conducted the study using the recently sequenced chicken genome. Obtaining DNA from commercial birds, they identified the number of alleles found throughout. Alleles are the genes that pair up to produce specific traits such as eye color. By comparing the commercial breeds with native and non-commercial birds, they found that commercial lines had lost up to 90 percent of alleles in some cases.

"We suggest interbreeding some experimental commercial poultry lines with native or standard breeds as a backup plan, or ace in the hole, to help the industry meet future challenges, as traits such as disease resistance may be found among the rare alleles of other birds," he said.

Muir said maintaining a healthy genetic reservoir in food-producing animals is crucial in order to protect the nutritional demands of a growing global society. Poultry is the leading meat consumed in the United States and in most other countries, with chicken meat production increasing by 436 percent since 1970, he said.

Muir also is project co-leader in a $10 million international effort to test a breeding strategy called whole-genome selection that could be used to improve the accuracy and efficiency of breeding methods. He said companies could use this technique to select for important parts of the DNA of donor birds from the standard or ancestral breeds and integrate those into commercial lines without dragging bad DNA into industrial populations. The approach selects breeding poultry based on specific traits such as bone density, animal well-being, feed efficiency and disease resistance

Collaborators in the commercial breed analysis research included Cheng, Sean MacEachern and Huanmin Zhang of the USDA Avian Disease and Oncology Laboratory; Gane Ka-Shu Wong of the University of Alberta, Canada and the Beijing Institute of Genomics; Yong Zhang and Jun Wang of the Beijing Institute of Genomics; Martien Groenen, Richard Crooijmans and Hendrik-Jan Megens of Wageningen University, Netherlands; Ron Okimoto of Cobb-Vantress Inc., Arkansas; Addie Vereijken, Annemieke Jungerius and Gerard Albers of Hendrix Genetics, Netherlands; Cindy Taylor Lawley of Illumina Inc., California; and Mary Delany of the University of California, Davis.

Journal reference:

1. William M. Muir, Gane Ka-Shu Wong, Yong Zhang, Jun Wang, Martien A.M. Groenen, Richard P.M.A. Crooijmans, Hendrik-Jan Megens, Huanmin Zhang, Ron Okimoto, Addie Vereijken, Annemieke Jungerius, Gerard A.A. Albers, Cindy Taylor Lawley, Mary E. Delany, Sean MacEachern, and Hans H. Cheng. Genome-Wide Assessment of World-Wide Chicken SNP Genetic Diversity Indicates Significant Absence of Rare Alleles in Commercial Breeds. Proceedings of the National Academy of Sciences, November 3, 2008 early online edition

Adapted from materials provided by Purdue University.

SWEDEN: Free-range chickens are more prone to disease
14.jan.09
BioMed Central
Charlotte Webber
http://www.eurekalert.org/pub_releases/2009-01/bc-fca011309.php

Chickens kept in litter-based housing systems, including free-range chickens, are more prone to disease than chickens kept in cages, according to a study published in BioMed Central's open access journal Acta Veterinaria Scandinavica.

Researchers led by Oddvar Fossum, at the National Veterinary Institute in Sweden, noted that during the switch in housing from battery cages to enriched cages and litter-based systems, including free-range, there was an increase in the number of chickens dying. During the study, the authors compared the causes of deaths in flocks of chickens kept in different types of housing across Sweden.

The Swedish Animal Welfare Act from 1988 mandated a switch from battery cages for laying hens to alternatives, including free-range and indoor litter-based systems, allowing birds to behave naturally. Between 2001 and 2004, there was a large increase in the numbers of flocks being kept in more humane housing.
The cause of death was recorded in 914 hens from 172 flocks. For each of the birds tested, the housing system of their flock was recorded. There were significantly more deaths in flocks farmed either free-range or from indoor litter-based systems than in flocks of caged chickens.

The most common cause of death recorded was bacterial infection, most often caused by E. coli. These diseases were more frequently seen in flocks from litter-based and free-range systems than in caged birds. In addition, free-range chickens and chickens from litter-based housing were more likely to have been pecked by other birds, which can affect welfare and lead to death. Parasitic infections caused by mites were also more common. However, housing did not appear to affect the incidence of viral infections

The authors emphasize that, because of the change in housing systems that occurred between 2001 and 2004, many of the farmers caring for these flocks lacked the experience and knowledge that would have prevented the higher mortality and disease rates. According to Fossum, "birds kept in indoor litter-based and free-range housing are more prone to disease but measures can be taken to counter this." Fossum adds,"the health of Swedish laying hens kept in these systems has improved as the farmers have become more experienced in managing the new housing systems."

Notes to Editors
1. Prevalence of antimicrobial resistance among bacterial pathogens isolated from cattle in different European countries: 2002-2004
Rene S Hendriksen, Dik J Mevius, Andreas Schroeter, Christopher Teale, Daniele Meunier, Patrick Butaye, Alessia Franco, Andra Utinane, Alice
Amado, Miguel Moreno, Christina Greko, Katharina Stark, Christian
Berghold, Anna-Liisa Myllyniemi, Dariusz Wasyl, Marianne Sunde and Frank
M Aarestrup
Acta Veterinaria Scandinavica (in press)

Antibiotics called 'vital tool'
Feedstuffs
October 6, 2008

Good chicken health achieved through responsible use of vaccines and antibiotics is important not only in providing food for consumers but also in environmental sustainability and the socioeconomic lifestyles of rural Americans, Dr. Spangler Klopp said in testifying for the National Chicken Council (NCC).

Healthy chickens require less feed and less housing space, produce less manure and produce more chicken meat compared to chickens that are not provided such interventions, he said.

Klopp noted that livability has increased from less than 94% in the early 1980s to nearly 96% today, without which an additional 200 million chickens would need to be grown out to produce the same amount of chicken meat. Chicken deaths in the field are "a fraction" of condemnations in the 1960s, he added. Altogether, if producers were not allowed to use antimicrobials and other Medical interventions to improve the health and productivity of their flocks, an additional2.8 billion chickens would need to be grown and processed every year, he said.
'Clear improvements' Maintaining the health and well-being of their turkey flocks "is paramount" to turkey growers, said Dr. Michael Rybolt, director of regulatory and scientific affairs for the National Turkey Federation (NTF).Rybolt said advances in turkey production in the last 30 years have been driven by science and have resulted in "clear improvements in efficiency." He noted that,
in 1970, for instance, 105 million turkeys were grown with an average liveweight of 17 lb. and totaled 1.5 billion pounds of turkey meat production, which contrasted with last year, when more than 260 million turkeys were raised with an
average live weightof 28 lb. and totaled nearly 6 billion pounds of turkey meat production. Rybolt said one of the most significant of these advances has been environmentally controlled housing that decreases bird stress and leads to better and more efficientproduction.

He said the use of antimicrobials for disease prevention, control and treatment is necessary for the health and welfare of turkeys, allowing growers to control and eradiate diseases when they do occur, which improves livability and increases turkey meat production at affordable prices for consumers.
Without technological tools, Rybolt said, the turkey industry could not produce "6 billion pounds of safe, wholesome and nutritious turkey meat products."

Sand and fibre in diet reduces cannibalism
World Poultry Net
15 Oct 2008

Adding sand and fibres to poultry feed can prevent cannibalism among chickens because the time spent on eating is prolonged, says Dr Marinus van Krimpen from Wageningen University in the Netherlands.

Wild chickens spend 60% of their time looking for food. Etiologists think that feather picking in domesticated chickens is a derived from this behaviour. However, with the high energy diets in commercial poultry farms, animals do not spend a lot of time eating anymore, which leads to boredom, feather picking and even cannibalism.In his research, Van Krimpen ‘diluted’ conventional diets with sand and fibres, which means that the chickens spend more time finding food. The fibres also made the feed more filling for the birds. It was shown that this measure leads to a significant reduction in feather picking if the sand and fibre is provided from the beginning. "If you only give the older chickens the 'diluted' feed you are too late," says Van Krimpen. "The feather picking is then already

picked up by the birds."This study plays in on the ban on beak trimming in 2011, and the ban on caged systems in 2012. From 2012 all the chickens will be held in groups, meaning aggression will be higher and problems such as feather picking will increase. Some poultry farmers are already using the diluted feed. The disadvantage for the farmer is that he/she has to buy a greater volume of feed. Additionally, more manure is produced.

Dietary Changes Can Reduce Feather Pecking in Laying Hens
ThePoultrySite
Oct 30, 2008

Krimpen, M.M. van, 2008. Impact of nutritional factors on eating behavior and feather damage of laying hens. PhD Thesis, Wageningen University, The Netherlands. (In English, with summary in Dutch.)

Feather pecking in layers remains a significant problem for egg producers but a recent report from the Netherlands proposes some simple changes to the diet to reduce this behaviour, writes Jackie Linden for ThePoultrySite. In his PhD thesis, Dr Marinus van Krimpen of Wageningen University highlights how diet dilution and adding fibre in the rearing and laying feed can alleviate the problem.

"Feather pecking remains one of the major problems facing the poultry industry," explains Dr Marinus van Krimpen of Wageningen University in the Netherlands, "because it is a significant welfare insult for the hens, an economic burden for the farmer and a pressing societal concern."

Dr van Krimpen has just recently completed his PhD thesis entitled, Impact of nutritional factors on eating behaviour and feather damage of laying hens at the University of Wageningen in the Netherlands.

Jungle fowl, the ancestors of modern commercial chickens, spend around 60 per cent of their time searching for food. It is thought that feather pecking behaviour that causes so much concern today is a substitute for normal ground pecking or feeding behaviour in the absence of adequate foraging incentives because of poultryman feeds are nutrient-dense and readily available.

In his thesis, Dr van Krimpen explains that beak trimming is a common and effective precautionary measure practiced by poultry farmers - to prevent serious feather damage and mortality despite some welfare concerns associated with the procedure causing pain to the birds. It has already been banned in Norway, Sweden and Switzerland, and a ban is expected in the Netherlands from 2011.

Making the problem more pressing is the ban on battery cages that is due to come into effect in all European Union countries in 2012. Feather pecking is by no means necessarily reduced in cage-free environments.

From a literature review, Dr van Krimpen found that energy and non-starch polysaccharide (NSP) concentrations and particle size of the added NSP source

reduced feather pecking behaviour in laying hens. However, these factors were often confounded in experimental diets.

So, he set the objectives of his study to examine how feeding and nutrition affect feather pecking behaviour in hens, to test whether selected nutritional changes could affect behaviour and finally, to examine carry-over effects of these factors from the rearing to the laying period.

Impact of Feeding Management on Feather Pecking in Laying Hens

A literature review revealed that specific deficiencies in layer diets are linked to feather pecking behaviour in laying hens. Severe feather pecking has been reported in birds that were fed a too low mineral level in the diet, a too low protein level or a too low amino acid level (methionine, arginine).

There appears to be somewhat more more feather pecking with diets containing only vegetable proteins compared to those fed some protein of animal origin.

Feather pecking is also more associated with diets that were restricted, coarsely ground or fed as pellets.

Feeding high-fibre diets, low-energy diets, or roughages reduced feather pecking.

Providing additional grain or straw in the litter during rearing could result in lower levels of feather pecking behaviour in adult stages.

Overall, it appeared that feather pecking was reduced when the birds spent more time feeding and foraging.

Effects of Nutrient Dilution on Feeding and Performance of Hens in Early Lay

In his first experiment, Dr van Krimpen measured the effect of dietary energy (11.8, 11.2 and 10.6 MJ/kg) and non-starch polysaccharide (NSP; 128, 146 and 207 g/kg) concentration, soluble NSP content (64 and 85 g/kg), particle size distribution of the NSP fraction (fine versus coarse) and feed form (mash versus crumbles) on feed intake, eating time and egg production of young hens aged 18 to 26 weeks.

Diets were diluted by low-NSP (sand and grit) or by high-NSP sources (oat hulls, straw, soya hulls, cellulose fibre, beet pulp and sunflower meal).

From the results, the researchers concluded that hens in early lay fed energy-diluted diets, as a result of addition of sand or grit (low-NSP) or NSP-rich raw materials (high-NSP) increased their feed intake so their feed intake and egg production were similar to the control group.

Insoluble NSP also decreased eating rate, so this could be a useful means to reduce feather pecking behaviour.

For subsequent experiments, sand was chosen to dilute the low-NSP diets, and oat hulls for the high-NSP diets.

Dietary Changes to Affect Behaviour in Hens Prone to Feather Pecking

In this experiment, effects of energy concentration, NSP concentration and particle size of added NSP source were examined separately on eating behaviour, feather pecking and hen performance of ISA Brown laying hens from 18 to 40 weeks of age.

The birds started to perform gentle feather pecking behavior during the 5th week of the rearing period. Dietary treatments did not affect maximal level of feather condition scores, but a rise of feather damage was delayed by 10 weeks in hens fed low energy, coarsely ground NSP rich diets compared to hens fed control diets.

Hens fed control NSP diets showed reduced culling rates, due to less cannibalistic pecking, if energy concentration was decreased (44.1% versus 13.1%). In high-NSP diets, however, culling rate slightly decreased when hens were fed low energy diets (31.6% versus 28.6%) (P=0.071).

Hens that were fed low energy diets compensated for 10% reduction in energy concentration by increasing feed intake by 9.3% (143.0 versus 130.8 g/d). Hen performance and body weight of the hens were not affected by dietary treatment.

It is concluded that hens that were fed low energy or high (coarsely ground) NSP diets spend more time on feed intake, compared with hens that were fed control diets. As a result, some treatments showed less feather pecking behavior.

Effects of Dietary Changes on Digesta Passage Rate and Gut Development

An experiment was conducted with ISA Brown layers from 18 to 40 weeks of age to investigate the effects of energy concentration, NSP concentration and particle sizes of added NSP on digesta mean retention time and gut development.

These findings indicated higher levels of satiety in laying hens, which may contribute to a lower feather pecking pressure.

Effects of Changes to Rearing and Laying Diets on Eating Behaviour and Feather Damage

The final experiment was set up to investigate the carry-over effects of nutrient density and NSP concentration in rearing diets on eating behaviour, feather pecking and performance in laying hens

Different levels of nutrient dilution and NSP concentration in rearing and laying diets were applied. Feed intake, eating behavior, feather pecking and development of gut segments in rearing and laying hens were measured.

Hens that were fed standard NSP diets during laying had more feather damage compared to hens fed high NSP diets (0.58 versus 0.30).

Increasing the insoluble NSP intake decreased proventricular weight and increased gizzard weight and its contents. There was a linear reduction in feather damage.

Providing diluted rearing diets increased feed intake from the first weeks of life onwards.

The researchers think it is likely that pullets were increasingly 'imprinted' on feed as a target for pecking when the diet is diluted. At the ned of the experiment, feather condition was best in those hens that had been fed the 15% diluted rearing diet.

Practical Implications

Dr van Krimpen found that increasing behaviour related to feeding and satiety by dietary changes successfully reduced feather pecking behaviour.

It was important that the changes were made during rearing and early laying. If the birds had already developed the bad habit of feather pecking, dietary changes were ineffective.

For laying hens, nutrient dilution and addition of coarse insoluble NSP prolonged the time the birds spent feeding and slowed down their feeding rate.

Providing 15% diluted diets by 15 per cent to pullets during rearing led to less feather damage during the laying period. Dilution of the rearing diet did not affect eating time at that stage but Dr van Krimpen suggested the change may have focussed pecking behaviour at feed rather than other birds.

The factor that most affected feeding-related behaviour and satiety of laying hens was the insoluble NSP content of the diet.

Interestingly, Dr van Krimpen found that the effects of diet dilution and NSP content were additive. The best feeding strategy to prevent feather damage, he recommended, was to feed a 15% diluted diet during the rearing period, followed by a 10% diluted and coarsely ground, high-NSP diet during the laying period.

Temperature Variation in On-Farm Hatching Egg Holding Units
The PoultrySite
October 30, 2008

The effects of oscillating and variable on-farm egg storage temperatures on hatchability and embryo viability in commercial broiler breeder flocks were studied by Dr Keith Bramwell, extension poultry specialist at the University of Arkansas in the Summer 2008 issue of *Avian Advice*.
Introduction
Broiler breeder hatching eggs are commonly held in storage facilities at the breeder farm anywhere from one to four days and again at the hatchery until placed in the setters. In the poultry industry, some pre-incubation of hatching eggs following oviposition and during storage is inevitable, yet efforts should be made to reduce this occurrence.

With the continued development of this industry there have been tremendous advances which have improved the available equipment to maintain hen house temperatures, and the quality of egg transportation vehicles and egg storage facilities in the hatchery. However, with this improved technology, on-farm egg storage facilities have been largely

neglected which has made it extremely difficult for producers to maintain constant egg storage room temperatures at the farm level.

While one purpose of egg storage is to accumulate eggs to meet the demand for chicks and to best utilize hatchery facilities, ultimately the goal is to arrest further embryonic development while maintaining embryo viability.

While an egg storage temperature of 68°F (20°C) is the most commonly practised industry recommendation, the actual on-farm egg storage temperature can range from a low of 60°F (15.6°C) up to 75°F (23.9°C). The range in egg storage temperature from one farm to the next is often due to different management programs, while day-to-day fluctuation within the same company is a result of poor egg storage facilities that are unable to maintain a constant storage temperature.

Hatchery egg storage conditions have been evaluated in the past, with recommendations presented to reduce losses in hatchability. However, research regarding egg storage at the breeder farm is limited and incomplete. The objective of this study was to determine the effects of oscillating and variable on-farm egg storage temperatures on hatchability and embryo viability in commercial broiler breeder flocks.

Egg Storage and Hatching Procedures
A total of 4320 hatching eggs were obtained from the University of Arkansas's Broiler Breeder Research facility and placed into two separate egg storage chambers, with all eggs stored at a control temperature of 70°F (21.1°C) for 0-24 hours.

After the initial 24-hour storage period, eggs were divided into 864 egg lots and assigned to treatment groups. One group of eggs remained at 70°F for the entire 72-hour storage period (control). Four other groups were moved to separate storage chamber with temperatures set at either 66°F (18.9° C), 68°F (20.0°C), 72°F (22.2°C) or 74°F (23.3°C) to represent Treatments 1, 2, 3 and 4, respectively.

Eggs were stored at these temperatures for an additional 24 hours for a total of 48 hours of storage time. Then eggs stored at 66°F were stored at 74°F, eggs at 74°F were stored at 66°F, eggs at 68°F were stored at 72°F, and eggs at 72°F were stored at 68°F for an another 24 hours for a total storage time of 72 hours.

After 72 hours of storage, all eggs were returned to 70°F.

Treatment details are outlined in Table 1. This design ensured that all eggs in this experiment were held at an average of 70°F for the entire three-day "on-farm" egg storage time period.

To summarize this design, all hatching eggs from the different temperature treatment groups were subjected to either a 2- or 4-degree F temperature fluctuation above and below the 70°F base temperature but were held at an average of 70°F.

After the storage period, eggs were transported to their original commercial breeder farm where they were placed directly on a commercial hatching egg transportation truck and sent to a commercial hatchery for incubation. No treatment or special care took place after the on-farm storage period.

Results and Discussion

The hatchability of eggs subjected to a 2°F temperature change from 70°F was reduced by nearly 2% compared to the control group (74.69 vs. 76.47% hatch, respectively). Eggs that underwent a 4°F temperature change had nearly a 1% loss in hatch as compared to the control group (75.61 vs. 76.47%, respectively). It is interesting to note that the greater temperature variation did not necessarily result in a greater loss in hatchability.

However, regardless of whether the temperature variation was 2 or 4°F, all hatching eggs used in the study moved from the hen house at about 80°F to the 70°F storage chamber for 24 hours.

Eggs that then increased in temperature for 24 hours and decreased for another 24 hours before increasing again to 70°F (i.e. 70°F-Δ- -Δ) experienced a significant drop in hatchability as compared to the control (3.55% and 2.16% loss in hatch, respectively, Figure 1).

Eggs in this group experienced multiple changes in temperature from the hen house to the hatchery. From the time of lay, these eggs decreased in temperature to 70°F then the temperature was raised for 24 hours, then lowered for 24 hours, then raised for 24 hours, then lowered as they were moved to the hatchery (67°F) then raised when moved to the setters (three periods of decreasing temperatures and three with increasing temperatures).

Eggs that were stored at 70°F then decreased in temperature for 24 hours, then increased after 48 hours then were returned back to 70°F (70-Δ- -Δ) experienced no difference in hatchability and less than 1% loss in hatch of fertile. Eggs in this treatment group basically underwent one change in direction of the temperature they were subjected to from the time they were laid until the eggs reached the commercial hatchery. These eggs decreased in temperature after lay to 70°F, then the temperature was decreased again for 24 hours, then increased for 24 hours, then decreased for 24 hours, then decreased again as they were moved to the hatchery (67°F) then raised when moved to the setters (two periods where temperatures were decreasing and two with increasing temperatures).

Each time the internal temperature of the egg is elevated to near 75°F, metabolic activity is again initiated and embryo development ensues only to be slowed again during additional egg cooling).

While cooling hatching eggs is necessary, starting and stopping embryo development weakens the embryo and reduces its viability. As illustrated in Figure 2, the ideal situation is for hatching eggs to undergo only two temperature direction changes; one from the hen to the lowest temperature point at the commercial hatchery egg storage facility and the second temperature direction as eggs are moved into the egg setters.

Conclusions

It is well known that most hatchability problems are a result of poor fertility. However, when egg production is attained and the flock maintains high levels of fertility, how we care for hatching eggs can have a tremendous effect on overall hatchability.

While current industry recommendations vary from 63°F to 70°F for on-farm egg storage, data from this research indicate that variations in on-farm egg storage temperatures of as little as 2°F can reduce hatchability by as much as 3.5%.

Experience from evaluating current on-farm egg room temperature values indicates that variation in the actual temperature and the set temperatures are great and often exceed those parameters established in this study. Therefore, regardless of the equipment in the breeder house and the hatchery facilities, hatchability is routinely lost in commercial hatcheries due to neglect of the on-farm egg storage facilities.

Summary
Maintaining a constant environment for hatching eggs prior to incubation is critical to achieve optimum hatchability.
Excessive temperature variation in on-farm hatching egg storage can cause hatchability losses of up to 3.5%.
Monitor egg storage and transportation conditions using temperature data loggers.
Make adjustments to equipment to provide hatching eggs with a constant environment. This can include stirring fans in egg rooms, improved heating and cooling equipment, and improved insulation properties in the egg room.

HORSES

Validity of indicators of dehydration in working horses

A longitudinal study of changes in skin tent duration, mucous membrane dryness and drinking behaviour
Authors: Pritchard, J.C.; Burn, C.C.; Barr, A.R.S.; Whay, H.R.
Source: Equine Veterinary Journal, Volume 40, Number 6, September 2008 , pp. 558-564(7)
Publisher: Equine Veterinary Journal Ltd.

Abstract:

Reasons for performing study: Dehydration is a serious welfare concern in horses working in developing countries. Identification of a valid and practical indicator of dehydration would enable more rapid treatment and prevention.

Objectives: To examine changes in bodyweight, clinical and blood parameters during rehydration of working horses, identify a 'gold standard' criterion for dehydration and use this to validate a standardised skin tent test, drinking behaviour and mucous membrane dryness as potential field indicators.

Methods: Fifty horses with a positive skin tent test, working in environmental temperatures of 30-44°C in Pakistan, were rested and offered water to drink ad libitum. Bodyweight, clinical and blood parameters, mucous membrane dryness, drinking behaviour and skin tent duration at 6 anatomical locations were measured at 0, 30, 60, 120, 180, 240 and 300 min.

Results: Skin tent duration was affected by side of animal (P = 0.008), anatomical location and coat moisture (both P<0.001). Younger animals had shorter skin tents at all time points (P = 0.007). There was no significant association between plasma osmolality (Posm) or water intake and skin tent duration. Horses with a higher Posm drank significantly more water (P<0.001), and had longer (P<0.001) and more frequent (P = 0.001) drinking bouts. Neither Posm nor water intake affected qualitative and semi-quantitative measurements of mucous membrane dryness significantly.

Conclusions and potential relevance: The standardised skin tent test and measures of mucous membrane dryness investigated in this study were not valid or repeatable indicators of dehydration when compared with Posm as a 'gold standard' criterion. The volume of water consumed and the number and duration of drinking bouts were the most reliable guide to hydration status currently available for mature working horses. Offering palatable water to drink ad libitum provides both the diagnosis and the remedy for dehydration in working horses.

SHEEP

Sheep model for fracture treatment in osteoporosis: benefits of the model versus animal welfare

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Animal models are necessary to evaluate new options for the treatment of fractures in osteoporotic bone. They permit both the biological response of a living system and the influence of the pathological processes to be taken into account. A sheep model for osteoporosis was established by combining oestrogen deficiency, calcium and vitamin D-deficient diet with steroid medication. Bone mineral density (BMD) was reduced by >30% after 12 weeks of combined treatment. Osteoporosis similar to the human situation with corresponding changes in the micro-architecture and mechanical properties of bone was observed. This publication focuses on the impressive results obtained with the model and contrasts them with considerations of animal welfare. Considerable side-effects associated with steroid medication became manifest. Animals in the treatment groups showed signs of infection of various degrees due to the immunosuppressive effect of the medication. The infections were mostly caused by Corynebacterium pseudotuberculosis. Antibody testing revealed a 100% prevalence of infection in this breed of sheep. A modification of the steroid treatment, i.e. less-frequent

injections, reduced the incidence of side-effects. This sheep model shows a significant and reproducible reduction in cancellous BMD of >30%, including relevant changes in biomechanical properties and increased fracture risk. However, the severity of the side-effects cannot be overlooked. The model must be improved if it is to be used in the future. Options to reduce the side-effects are discussed.

Farmers can spot lame sheep, but fail to prevent footrot spread
14.oct.08
BioMed Central
Charlotte Webber

Sheep farmers are highly able to spot even mildly lame sheep, but many do not take steps to prevent the spread of lameness in their flocks by catching and treating these animals. A study in the open access journal BMC Veterinary Research is the first to provide evidence for the accuracy of farmers' reporting of lameness, suggesting that farmers have one of the skills required to minimise footrot and other infectious foot conditions in their flocks.

Footrot, one of the most common causes of lameness, is infectious, caused by the bacterium Dichelobacter nodosus. Previous studies have shown that the rapid treatment of a sheep with footrot increases its rate of recovery and decreases transmission of the infection to other sheep. But are sheep farmers able to pick out sheep in the early stages of the disease? Dr. Jasmeet Kaler and Professor Laura Green, researchers at the University of Warwick, asked more than 230 farmers and sheep specialists to watch video clips of individual sheep and then say whether they thought the sheep was lame or not. They were then asked about when they would catch the sheep for inspection and treatment, or whether they would wait until more sheep in the flock displayed a similar level of lameness.

More than 90% of the study participants correctly identified mildly lame sheep, that is, those with an uneven posture, a shorter stride in one leg or a slight nodding of the head as they moved. However, the treatment of lame sheep varied considerably between farmers. Nearly 20% said they would treat lame animals on the first day, whilst about 70% said they would do so within a week. Farmers and sheep specialists were more likely to catch and treat a sheep as the severity of its lameness increased. The majority said they would catch a single lame sheep at the point where it would not bear its weight when standing and showed discomfort when moving. However, 25 farmers said they did not catch individual sheep at all and only treated lame sheep at routine gatherings. These farmers had highest prevalence of lameness in their flock (15%).

The authors say, "Our study indicates that farmers have the skills to follow the current advice about how to minimise lameness in sheep and prevent the spread of footrot among their flock. They should inspect – and if necessary treat – the first mildly lame sheep in a group within one to three days of it first being lame"

Research says singling out sheep will save 1.3 million from lameness

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Public release date: 14-Oct-2008

Source: "Recognition of lameness and decisions to catch for inspection among sheep farmers and specialists in GB" by Jasmeet Kaler and Laura E Green -
University of Warwick
Published in BMC Veterinary Research

New research from the University of Warwick published today in the journal BMC Veterinary Research suggests that a simple cheap individual approach to the care of sheep could slash the incidence of lameness in sheep saving 1.3 million sheep from lameness in the UK alone

Around 1.6 million of the UK's sheep are afflicted with lameness and 80% of that is due to the disease footrot. Footrot is infectious, caused by the bacterium Dichelobacter nodosus. Previous studies have shown that the rapid treatment of a sheep with footrot increases its rate of recovery and decreases transmission of the infection to other sheep yet lameness figures in many flocks seem to persist around the 10% level and 80% of that lameness is due to footrot.

The Warwick researchers wanted to find out why the disease seemed to persist at that level when they had found that cheap treatments are available that can produce a rapid recovery. The researchers first looked if sheep farmers were facing problems in identifying lame sheep.

Warwick researchers Professor Laura Green and Dr Jasmeet Kaler asked more than 230 farmers and sheep specialists to watch video clips of individual sheep and then say whether they thought the sheep was lame or not. They were then asked about when they would catch the sheep for inspection and treatment, or whether they would wait until more sheep in the flock displayed a similar severity of lameness.

In fact they found that almost all the study participants correctly identified lame sheep in need of further investigation, eg those with an uneven posture, a shorter stride in one leg or a slight nodding of the head as they moved. However they found a surprising split on how farmers then treated lame sheep. The researchers did find that 50% of farmers did move to catch, investigate and treat individual lame sheep within 72 hours of them exhibiting lameness however the remaining 50% took significant longer to respond leading to increased opportunities for the infection to spread. When farmers did act quickly disease rates fell dramatically and overall flock lames fell from around 10% to 2% of the flock.

Why then do 50% farmers and sheep specialists take longer to respond? The researchers believe this is simply down to different philosophies of flock management. Some farmers, put their efforts into more interventions treating all or a large section of a flock at the same time, other farmers might not have the right equipment or skilled dogs to isolate and catch individual sheep on a regular basis. Now that this research has identified the value of early identification and treatment of footrot it is hoped those

farmers will ensure that they have the resources to intervene quickly to regularly inspect and treat individual lame sheep

Professor Laura Green said "Our study indicates that farmers have the skills to follow the current advice about how to minimise lameness in sheep and prevent the spread of footrot among their flock. They should inspect – and treat appropriately – the first mildly lame sheep in a group within one to three days of it first being lame"

GENERAL

Implications of intensification of pastoral animal production on animal welfare
Authors: Stafford, K.J.; Gregory, N.G.
Source: New Zealand Veterinary Journal, Volume 56, Number 6, December 2008, pp. 274-280(7)
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Document Type: Review article

Abstract:

The intensification of pastoral animal production results from several major developments including increased forage production and utilisation, diet supplementation, breeding animals to increase milk, meat or wool production, and changes in management. The impact of increased intensification on welfare will differ across species and systems. More intensive-grazing systems and the feeding of novel forages will underpin all moves to intensification. More intensive grazing generally reduces opportunities for shade and shelter. Improved nutrition will generally benefit welfare but competition for available feed may cause increased social pressure. Increased flock and herd size will be associated with a reduction in the human: animal ratio and less time to observe individual animals. Remote monitoring of activity and health might counter this impact.

Intensification of dairy production will result in larger herds, more year-round milking, robotic milking, use of housing and yards year round, and total mixed-ration feeding. Larger herds mean longer distances to walk to and from the dairy shed, and more lameness and less time to spend on self-maintenance activities such as grooming. Holding and feeding dairy cows on yards will cause an increase in lameness and mastitis and perhaps an increase in agonistic behaviour but will reduce time spent walking. Intensification of sheep production will involve increased flock size, increased fecundity, breeding from hoggets, and breeding ewes all year round. Housing during lambing might be considered appropriate, as would feeding to lift milk yields. Increased fecundity with an increase in triplets will increase lamb mortality rates, but housing ewes, when managed well, will result in reduced lamb mortality. Intensification of lamb finishing will be by improved nutrition. Intensification of beef production will include more breeding of heifers at 15 months, and more problems with dystocia.

Intensification of pastoral production will have positive and negative effects on animal welfare. The balance will be determined by the quality of management and stockmanship, and the pressure on businesses to be profitable.

Animals Have Personalities, Too
Jeanna Bryner
Senior Writer
LiveScience.com Fri Oct 10, 9:25 AM ET

We know our siblings and in-laws have personalities - sometimes to a fault. But science recently has revealed that such individual differences are widespread in the animal kingdom, even reaching to spiders, birds, mice, squid, rats and pigs.

Now a new mathematical model helps to explain how and why such animal temperaments develop over time.

The model explains a central question of both animal and human personality - why certain individuals are more rigid or flexible than others, and why some change their behavior in response to changes in their environment while others do not.

The answer, says Franz Weissing of the University of Groningen, the Netherlands, comes down to costs and benefits. A group in which both rigid and flexible personality types co-exist makes for an optimal system, his model shows.

The field of animal-personality study is starting to gain some substance and credibility, said University of Texas psychologist Sam Gosling, who does research in this field.

"When I started doing this, like 10 years ago, things were really different. I remember people thought it was anthropomorphic [to use the term animal personality]," said Gosling, who was not involved in the recent study.

Prestigious scientific journals are publishing research articles explicitly on the topic of animal personality, he said.

"I think it does reflect a new sense of respect in the field and I think it's opening up all kinds of important opportunities and allowing us to test questions we simply couldn't test without animal studies," Gosling said.

Duck food

Weissing, who also works at Santa Fe Institute, and his colleagues, ran various model simulations of scenarios that included a resource as well as responsive and unresponsive animals. He said the new model shows, for example, when it's optimal for animals to react to a change in food and when it's not. It turns out that competing personalities help to keep a healthy balance in a group.

Say you have a duck pond in which, every day, twice as much food is scattered along the right side of the pond, leaving the left side sparse, Weissing said. The ducks learn to paddle to the right side to forage. Then one day, say, more food shows up on the left side of the pond, leaving the right with a dearth.

Experiments have shown that some of the ducks were checking out the left side of the pond all along and will notice and swim to the food on the left. Other ducks, however, will stick to their routine and continue about their business of scarfing up the little bit of food still on the right side.

The responsive ducks benefit from their quick move to the big pile of food, while the unresponsive ducks could starve, or at the very least, not get a bellyful.

The tables turn if too many ducks were to respond and head over to the left side of the pond. In this model scenario, the competition on that side of the pond would skyrocket, leaving some of these seeming smarty pants with little food. Meanwhile, the unresponsive ducks would benefit in this scenario, because while they would be left with a smaller portion of food, there would be hardly any competition for it.

In some of the model simulations, responsiveness could also be a waste of energy. If say the food never moves to the other side of the pond, the proactive ducks could exhaust themselves to no avail.

In the end, a balance between ducks that scan for change and ducks that stick with the routine would benefit the overall population.

Individuals coexist

The researchers also found animal personalities tend to persist. That's because, as the adage goes, practice makes perfect. Individuals who are responsive gain experience, so it behooves them to continue such behavior in the future.

"Individuals that have been responsive before have a slight advantage in collecting or interpreting environmental cues," Weissing told LiveScience. "This is a plausible assumption, since the performance of individuals generally improves with the experience they have."

Similar personality types also exist in humans. "Some humans behave rather routine, in a rigid way. And others behave in a rather flexible way," Weissing said. "The first type is rather traditional, conservative, always following the trodden path of the past, whereas the other type is more interested in change, interested in the environment, always sampling the environment."

While the model simulations didn't directly analyze human behavior, Weissing said there is a crossover between non-human animals and the rest of the animal kingdom.

Animal Behaviour Gets Danish Attention
The BeefSite
Friday, December 12, 2008

DENMARK - A PhD course on stress reactions in animals is attracting PhD students from many European countries. The organisers are very pleased about the interest in the course, although it means that not all applications can be met this time round.

There is considerable interest in finding out how and, particularly, why animals react to stress the way they do. The applications to a new PhD course, developed by two scientists from the Faculty of Agricultural Sciences, have certainly been pouring in to such an extent that several applicants have had to be turned down.

One of the organisers, senior scientist Mette S. Herskin, regretting that several have applied in vain, but also pleased that there is so much interest in the course.

- We have worked hard at putting together a good course and have engaged a team of brilliant guest speakers for the teaching. It is enormously satisfying with such an interest in the subject, and we are contemplating repeating the course, she explains. The maximum number of participants was set at 30 and when the deadline had passed, 36 students from several European countries had applied.

Stress in a wider context

The scientists from the behaviour and stress biology group at the Department of Animal Health, Welfare and Nutrition are looking forward to giving students the chance to gain in-depth knowledge of the mechanisms that control stress reactions. As is evident from the list of participants, not only scientists working with animal welfare can benefit from a better understanding of stress reactions in animals.

Several research branches have no tradition for looking at stress in animals in a wider context, as the scientists- understandably enough - focus on the specific body parts or cell types they are studying, explains Mette S. Herskin, who has been working with animal stress reactions for a number of years. She and her colleague, senior scientist Jens Malmkvist, who is a co-organiser of the course, are greatly looking forward to welcoming the participants in the middle of January.

- The PhD students have different backgrounds and approaches to stress, which should give a good basis for some exciting discussions. There are, for example, people who work with the behaviour of pets, stress in artic animals as a result of global warming, traumatised humans, animal models of human diseases, and animal welfare, recounts Mette S. Herskin.

More courses on the way

Mette and Jens expect to be able to offer other PhD courses with focus on subjects related to stress in animals.

- When we planned this course on stress in animals, we saw it as the first in a number of courses all dealing with new trends in stress biology, which we will hold at intervals of two to three years. That is what we are aiming for anyway, she says.

For the Faculty of Agricultural Sciences it is pleasing that one of the first PhD courses offered by the faculty has been in such demand.

- We are really pleased that there is so much interest for the PhD courses we have initiated, says Bo Kjelde, who is the administrator of the faculty's PhD school SAFE, which has formally existed for just over a year and which has co-financed the PhD course. The course is also supported by the doctoral school SNAK and the stress group at Aarhus University, which spans several faculties.