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Comparison of divergent views on housing for pregnant sows

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Abstract

Historically, animal husbandry decisions have been the responsibility of the animal owner. Only in cases of obvious harm was there public intervention. This is no longer the case. Today, there are groups that wish to impose their ideas and values about animal welfare upon farmers through mandates and regulation. In the past, this would have been unlikely, but the dynamic of public decision making has changed dramatically with the information age. Through directed public relations efforts, small groups have gained great public influence on focused issues, including animal welfare. There is a movement at work that wants to move the decision-making on animal welfare issues from the barn to the boardroom or to the political halls.

Finding common ground on the issue of animal welfare will be challenging because of the diversity of views. Individual views on the issue of animal welfare are unique and a reflection of our values, experiences, and knowledge. When lacking experience with a particular type of animal, our views tend to be extrapolations based upon experiences with other species, or values gained by anthropomorphic associations. With this approach the risk of bias is high.

Fundamentally, our precepts on animal welfare are based upon our moral and ethical foundations about 1) the equality and relationship between species, and 2) the duties or obligations people have to those animals under their care. Most individual precepts are non-negotiable and arise from the core of our being. They are a principled reflection of historical perspective, personal experience, and knowledge. A lack of consensus on these fundamental precepts will undermine any attempt at reconciling tactical matters about animal welfare.

Tactically, decision-makers at four levels are being challenged to apply their core precepts to animal care. This is being done through individuals and groups that mandate, legislate, regulate, and apply the concepts (housing and management designers, educators and advisers, and those who work daily caring for the animals). To say that there is a lack of accord between these groups on key issues is an understatement. The cornerstone for resolution of disagreements over tactical issues (what is best for the sow)

will ultimately hinge on agreement on the moral and ethical concerns of the stakeholders. This requires the inclusion of all participants in the decision making process. Hopefully, at this point science and reason will meet the essence of humanness.

One of the key obstacles to a consensus position is the credibility of behavioral science. Since many behavioral studies rely heavily upon subjective measures, they are often times considered "soft" by other disciplines and are met with skepticism. Likewise, reliance on "production values" alone is unacceptable to advocates of behavioral science. Divergence on these issues must be resolved for a consensus position. Bridging this obstacle is essential if politics are to be prevented from dictating policy.

Unintended errors are likely if animal caretakers and veterinarians are not included as advisors to industry and government. Failure to do so will result in compartmentalization and re-prioritization of the issues, potentially giving certain conditions incorrect status. For example, should sow mental status be given greater importance than sow survival? Not only should there be advocacy for the sow, but there must also be advocacy for societal concerns and for human safety.

Introduction

The housing of sows and pigs is a significant public issue. Special interest groups are applying pressure on food merchandisers and regulatory agencies to ban certain housing methods. They are mounting active public relations campaigns and demanding changes in the way pigs are managed, the primary being the abolishment of individual sow housing systems.

In response to criticisms, Burger King recently announced publicly that in 2002 they will encourage alternative means for housing gestating sows and will begin buying pork from producers who deploy such alternatives. McDonalds and Wendy's are also considering similar policies. A constitutional amendment has even been proposed in the State of Florida that would ban tether and individual stall housing. The European Union has adopted a ban on tethered housing systems that will take effect in 2005, forcing farmers to adopt group-housing systems.

A change from individual to group-housing has significant implications for the North American producers. Facility modification and retraining of the work force will require very significant capital and time. Further, many waste management systems will have to be replaced or radically modified if group housing, particularly bedded housing, is mandated or regulated to the industry. Access to domestic and foreign markets may become more limited based upon housing system. Advisors to the European Union have even proposed “closing the borders for meat ... produced under less strict animal welfare conditions” (Jensen et al., 1997). Concerns raised over the issue require that producers and veterinarians review sow housing configurations and determine if they are currently managed in the best interest of the sow.

This paper will present a summary of the criteria being benchmarked to evaluate sow welfare and highlight new perspectives that are impacting public policy. It is not a comprehensive review of possible sow housing configurations, though concerns and unique alternatives will be mentioned.

Animal welfare: Freedom and needs

There is a lack of consensus on the definition of animal welfare. Welfare is traditionally defined as “the health, happiness, and general state of well-being” (American Heritage Dictionary, 1991). In broader terms, welfare is defined in terms of freedoms or needs. Historically this has included freedom from hunger, thirst, discomfort, pain, injury, disease, fear, and distress. There is little debate that these freedoms are fundamental. Health status, longevity, survival, and reproductive performance are the major criteria used to evaluate these freedoms.

Newer proposals, however, suggest that these criteria are not the only determinants of animal welfare (Jensen et al., 1997). Recently, new freedoms have been proposed as essential. First is the freedom to express normal behavior. Advocates of this approach suggest that farm animals have needs like their wild ancestors, and failure to allow this behavior is an inherent degradation of welfare. They suggest that animals should have the ability to do the following:

- Regulate the body state and control interactions with the environment
- Escape the debilitating effects of low body temperature
- Carry out foraging behavior
- Build a nest
- Ingest and digest colostrum and milk
- Rest and sleep by acquiring a sleeping posture on a suitable surface without disturbance

- Explore their surroundings so as to find possible sources of danger, and hide or show escape responses if necessary
- Exercise
- Adopt postures which do not cause discomfort
- Eat preferential foods
- Keep the body clean
- Bond with the mother and obtain from her colostrum, milk, protection, and information about food, danger, etc.
- Deal with social situations
- Develop social ability by interacting with conspecifics

This approach inherently adds the freedom of self-determination or “the possibility to carry out an action or avoid a problem.” This approach relies upon measures of preference and aversion for determining welfare status.

Detractors of this approach suggest that many behaviors displayed by wild ancestors are simply survival-directed activities. For example, wallowing is not needed unless the ambient temperature is above the thermal neutral zone. Thus, sows in systems that ameliorate this challenge do not require this behavior. Detractors also suggest that instinctive behaviors such as nest building, which manifest phantom-like in barren systems, do not negatively affect the welfare of the sow. Furthermore, many social situations which arise in the wild may inherently put the animal at risk of injury. For example, communal batch feeding in open areas, such as that seen in the wild, provides for negative social interaction (fighting) that places sows at risk of injury. Subscription to the premise that sows need to express behaviors seen in the wild implies that mating is a necessity. Adoption of this premise would preclude artificial insemination.

As an expansion of the preference/aversion approach to evaluating welfare, Wemelsfelder (1993) suggests another essential freedom—“the freedom from boredom.” She proposes “animals are not simply passive reactors to stimuli but that higher level integrative processes transform animals into organisms that can anticipate events with flexible behavioral responses.” Outcomes for measuring this approach are subjective and involve the assessment of “animal awareness.” Advocates of this approach suggest that the inability to engage in species-typical behavior gradually impairs the animal’s capacity to show anticipatory responses, giving rise to inflexible (stereotyped) behavior. Consequentially, the animal goes through three stages as a result of the deprivation: frustration (when anticipatory processes are still intact), boredom which comes from growing impairment of the animal’s response capability, and, finally, depression/anxiety (when all attempts at active control cease).

With this approach, freedom to explore is essential for the animal's welfare.

Progressively, others (Jensen et al., 1997) advocate that environmental enrichment is essential for satisfying the exploration welfare component. However, novelty seems to play a key role in stimulating interest with the pig (Heizmann et al., 1988). English et al. (1994) compared weaned pigs in standard flat decks to flat decks with recreational enrichment with tires or chains. "Playthings" were judged not to affect the welfare of the pigs in this study. Peterson et al. (1995) found a similar response in weaned pigs. Young pigs do appear more attentive to destructible materials (Grandin and Curtis, 1984; Feedes and Fraser, 1993). Pigs that direct their time toward rooting and chewing of straw spend less time directed toward penmates (Fraser et al., 1991). Again, without some cognitive evidence, one can only speculate whether these activities are essential needs or are they simply activity.

Duncan and Fraser (1997) suggest that, categorically, there are three ways to approach animal welfare:

- The "feelings-based" approach
- The "functioning-based" approach
- The "nature-based" approach

The "feelings-based" approach defines animal welfare in terms of subjective animal experiences. It deals with feelings and emotions, emphasizing promotion of positive feelings (comfort and pleasure) and reduction of negative feelings (suffering, pain, etc.). This approach is highly subjective. The "functioning-based" approach defines welfare in terms of normal or satisfactory biological functioning of the animal. Measures used to evaluate this approach include health, longevity, reproductive success, and disturbances in behavior and physiology. The "nature-based" approach proposes that animals should be able to perform their full repertoire of behavior. Duncan and Fraser also suggest that a consensus definition is unlikely, for the quality of an animal's life is never fully objective; it involves a mixture of scientific knowledge and value judgments.

At times the desired freedoms or needs of animals are in conflict with what is best for the animal (or, for that matter, society). In such cases, a freedom might be considered, on the one hand, as necessary. However, upon inspection this freedom could be judged harmful and consequentially restricted because of the accompanying negative consequences. For example, freedom to roam in a pasture might be considered a necessary freedom. However, the negative consequences of disease, parasitism, sunburn, environmental damage, and worker injury could be deemed too great a price to pay for the freedom. Consequentially the freedom would be restricted because, on balance, it is in the best interest of both the animal and

society. Likewise, sows prefer to eat all they want, even to the point of obesity; however, this is not in their best interest. Therefore, farmers limit-feed sows for their best interest. Sows may prefer to socially interact; however, housing configurations that allow this freedom place some portion of the population at great risk of being bullied, attacked, and possibly deprived of adequate feed intake. Those farmers who feel this is too high a price to pay for the freedom are likely to elect individual stalls. Others might consider this to be a reasonable cost and provide sow group interaction. Pig farmers have long been adjudicators, representing the best interest of the pig. Therefore, one can understand why they might consider it insulting that outside forces wish to limit this role. This is not to diminish the value of outside opinion. It simply emphasizes the need to include the animal caretaker in the discussion. In balance, this would appear to be appropriate.

The ethical perspective

The quintessential question is what duties do humans have to animals under our care; at what level of care can one justify the use of animals, whether it be for the production of food and fiber, for performance, or for companionship? The answer is the critical basis upon which all decisions concerning animal welfare are personally rooted and serve as the guide for personal action. Ethicists suggest that our individual view of welfare is fundamentally associated with our perspective of humanity's duties to animals. This perspective is inherently based on one's moral and ethical concept of what is right. Sandoe et al. (1997) propose four competing categorical views that ultimately underlie one's view:

- Utilitarianism: that we extend to other species the basic principles of equality that most recognize should be extended to all members of our own species.
- The animal rights view: this principle denies that we can justify good results by using evil means that violate individual rights; sanctioning the disrespectful treatment of the individual in the name of social good will not be allowed.
- The species-integrity view: that we ought not only focus on the individual as a moral concern, but rather we ought also to promote the value of the species (i.e., we should regret the loss of a specie because its existence is in itself morally valuable).
- The agent-centered view: that our treatment of animals is important because it affects us as moral agents, as the judges and keepers of moral integrity. Our duties toward animals are merely indirect duties towards humanity. Fundamentally, this view reflects the desire to prevent or relieve pain because it is a natural element of caring, and we betray our ethical selves

when we ignore it or concoct rationalizations to act in defiance of it.

Sandoe et al. (1997) also suggest that, as a beginning point, everyone should have a clearly defined moral perspective of an animal's standing. This demands that individuals develop a reasoned perspective of how animals should be treated relative to their standing with humans. By proactively defining this moral/ethical perspective, one is better able to differentiate and defend their actions at the most fundamental level.

This is not simply a matter of individual conscience. Corporate and business leaders will likewise be challenged to subscribe through their mission statements and tactical activities to a particular view. This debate will surely challenge businesses to establish their own moral and ethical standards as it relates to animal welfare. To default on the matter means the company will be dictated to by outsiders.

Welfare assessment

Classically, four outcome categories are used for welfare assessment: behavior, physiology, health, and reproductive performance. Health (injuries, lameness, longevity, sunburn, parasite burden, urinary tract disease, heart failure, and infectious disease incidence), and reproductive performance (wean-to-estrus interval, pigs/litter, and litters/sow/year) are objectively assessed with ease. Freedom from fear can be assessed by postural evaluation. Alteration in the animal's physiology has been inherently linked with welfare because of its tie with the pre-pathologic state referred to as stress. The major physiologic parameter examined has been glucocorticoid activity, though more recently measures of immunocompetence have been proposed as stress indicators. Interpretation of glucocorticoid activity response is challenging because multiple factors, including duration of response, extent of daily fluctuations, and variation in magnitude must all be accounted for in the evaluation (Jensen et al., 1997). Differentiating between normal physiologic responses and stress-related responses can be challenging. Skeptics suggest that truly pre-pathological changes will be reflected in health measures such as longevity, disease incidence, etc., negating the need to assess physiologic responses.

Behavioral outcomes have traditionally focused on the incidence of stereotypies. Stereotypies are repeated, relatively invariable sequences of movements which have no obvious purpose. Stereotypies include repetitive actions such as head weaving and oral activities such as rock chewing, bar biting, sham chewing, drinker pressing, repeated patterns of trough nosing, and tongue sucking. Stereotypies are considered by behaviorists to be sequela to deficiencies in the animal's environment, resulting in the animal being severely or chronically frustrated.

There is some debate over what behaviors are actually stereotypies, however. For example, many behaviorists consider bar-biting to be a stereotypic activity. Dailey (1995), however, suggests that the proportion of time spent by indoor-housed sows bar-biting is equal to the time outdoor sows spend rock chewing. This suggests that bar-biting is a manifestation of a normal activity. This finding highlights the subjective nature of behavioral assessment and the difficulty in measuring cognitive responses in uncommunicative animals.

Depending on what freedoms are considered as essential, one might also include "feeling" outcomes, indicating the state of frustration or boredom. These include outcomes such as stereotypies, postural changes, responsiveness, or evidence of self-narcotization. Detractors of this approach suggest that these outcomes are highly subjective and are simply indicators of the sow's adaptation to the environment.

Curtis (1987) suggests that physiologic needs, safety needs, and behavioral needs be addressed in that order because of the reliability of assessment outcomes. Hurnik and Lehman (1985), likewise, make the same recommendation, proposing that "life-sustaining" needs are the most basic, followed by "health needs," and then "comfort-sustaining needs."

Stockmanship factors affecting welfare

It is through human interactions, environmental design/operation, and management that the welfare of the animal is ultimately prescribed. Humans can contribute to an animal's welfare in the following ways (Jensen et al., 1997):

- Direct damage to the animal
- Neglect which is deliberate, accidental, or due to a lack of knowledge
- Incorrect or insufficient feeding
- Provision of inadequate conditions during housing, transport or marketing
- Disease
- Failure to provide for emergencies
- Improper procedures prior to and during slaughter

The impact of human interaction with sows is evident in studies linking human demeanor and attitude with performance. For example, stockperson behavior is a good predictor of the level of fear of humans by pigs (Hemsworth et al., 1989). Further, when pigs are fearful of humans, reproductive performance can be negatively affected (Hemsworth et al., 1981; Hemsworth et al., 1989). Attitude towards tasks associated with pig handling is a

good predictor of the person's behavior and the level of fear of humans by pigs (Hemsworth et al., 1989). Hits, slaps, and kicks elicit fear in the pig, while pats, strokes, and resting of the stockman's hand on the pig's back decrease fear. Fear response to one human can extend to all humans (Hemsworth et al., 1981). Thus, stockmanship is a key element in pig welfare.

Environmental factors affecting welfare

Comprehensive literature reviews of sow housing have been published (Jensen et al., 1997; Barnett et al., 2001). In the literature, four general categories of sow housing are generally mentioned: outdoor, tether, individual stall (crate), and group systems. However, categorizing sow housing systems is difficult because of the plethora of components that constitute a system. Within each of these systems, minor configuration changes can have significant effects on welfare measures. This variation makes comparison between systems difficult.

Tether systems may be either girth or neck tethers, and may include various configurations for feeding (open vs. solid dividers). Detractors of tether systems point to increases in adrenal activity as an indicator that the sows are stressed. However, Barnett et al. (1987) suggest that, when the possibility of aggression is minimized by the use of barriers between the heads of adjacent sows, cortisol activity is minimized.

Individual pen stalls are very commonly used in many parts of the world. They vary in the following ways:

- Width and length relative to sow size
- Penning
- Attachment and fittings (base plates and bolt placement)
- Head and rear gate configuration
- Pen divider configuration (horizontal vs. vertical bars)
- Feeding station configuration
- Presence or absence of partial solid partition between sows
- Trough design
- Feeding frequency
- Water delivery system and availability

Improperly sized stalls can be uncomfortable for sows and make lying down and standing more difficult. Uncomfortable sows are less likely to stand, decreasing urination frequency, and increasing the risk of urinary tract disease. Improperly placed attachments and fittings can be injurious, particularly when sows attempt to get up

quickly (Reeves, 2001). Head and rear gates, improperly designed, can lead to decubital sores; however, with modern stalls, this is uncommon (Reeves, 2001). Relative to group housing, stalls are beneficial for the sow for the following reasons (Jensen et al., 1997):

- Fighting and associated stress and injuries are prevented
- Each sow has a full ration of feed available to her
- All sows can be fed at the same time
- Care-taking is easier
- Signs of morbidity, such as feed refusal and vulval discharges, are easy to detect and treat

Detractors of sow stalls feel strongly that the stall-housed sows are environmentally impoverished and frustrated. They propose that frustration arises from the unresolved aggression with neighboring sows, a lack of exercise (with subsequent bone and muscle weakness) and the inability to turn around.

In addition to the variables listed above for individual stalls, group systems may vary by the following:

- Dynamic vs. stable group management
- Pen size and configuration
- Escape barriers and zones
- Number of sows per pen
- Feeding systems
- Batch vs. individual feeding systems
- Floor feeding vs. stall feeding
- If stall feeding is used, trickle feeding or Electronic Sow Feeders (ESF) can be used

Group systems are generally chosen by farmers who believe that space, exploration, and social interaction between sows are important freedoms. Space requirements are determined by the need for "resting or lying" space. Broom (1981) suggests that adequate space is required to reduce the following:

- Damage to the body due to physical contact
- Interference and competition at feeding
- Impedance when starting to flee
- Disease or parasite transmission
- Chance of rape

Jensen et al. (1997) suggest that a pig has a need for "an empty area around the body . . . so as to perform its basic movements and behavior patterns." They refer to this space as "micro-territory, personal space, or social space." Dynamic groups in general are disadvantaged relative to

stable groups. The addition of new sows to a group leads to social instability that can only be reestablished by fighting. Within groups of sows, those lowest on the pecking order are marginally disadvantaged relative to their penmates. To prevent disadvantaged group-housed sows from being injured by their penmates, escape barriers have been proposed. The reproductive performance of dynamic groups of sows is likely to be negatively affected. Mixing of sows at or near the time of fetal implantation increases the of risk reduced litter size (Simmins, 1993) and/or pregnancy loss (Bokma, 1990). Group-housed sows are at risk of injury due to bites to the vulva or skin, particularly near the head and shoulder. Jensen et al. (1997) suggest that "better stockmanship is necessary to prevent these adverse affects." To reduce fighting that is common in group systems, stall feeders such as "trickle feeders" or ESF have been proposed. These systems are more challenging to operate than floor feeding or sows fed in stalls.

Within systems, there are still other factors that make system comparisons difficult. These include the following:

- Watering systems
- Ventilation systems
- Cooling systems
- Flooring substrate and configuration
- Bedding use and type
- Environmental effects
- Stocking density
- Herd health status/health level
- Repair and maintenance of equipment
- Operator management

Summary

As the debate over sow housing continues, there must be some agreement on ethical issues, such as equality of species and people's duties to animals. Agreement is also essential on tactical issues, such as what freedoms are essential and what measures best indicate welfare. Other questions that need to be addressed include the following:

- What is the potential for a mandated or legislated change to have the opposite effect of that intended?
- What effect will the promotion of one system over another have on farm worker welfare?
- Based upon priority status, what factors should be judged most important?
- Even within priority rankings, should all considerations be given equal weight?
- What will be the cost of proposed changes?

- Will the change create a disadvantage for those it is purportedly intended to help, i.e., the family farmer?

Resolution of the debate hinges on these issues. Most producers care strongly about their animals and feel that they are providing excellent care. The outcome of the debate over animal welfare will hinge on whether or not the general public perceives this truth. By what we do as producers and veterinarians, we must be perceived as kind, gentle, compassionate, benevolent, and civilized.

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