

SCAW-FASS AGRICULTURAL CONFERENCE REPORT

On May 22-23, 2006 SCAW and FASS sponsored a conference on *The Humane Care and Use of Agricultural Animals in Research*. SCAW will publish the edited and enhanced proceedings of this conference in early 2007; watch the SCAW web site for further information on this publication. Below are excerpts from the conference proceedings.

SCIENTIFIC METHODS OF ASSESSING ANIMAL WELL-BEING¹

Daniel M. Weary and David Fraser
Animal Welfare Program, Faculty of Land and Food Systems
University of British Columbia, Vancouver

There are three intersecting views about what constitutes satisfactory animal welfare. One view, traditional among veterinarians and livestock producers, emphasizes the animal's biological functioning, such as health, growth, and productivity. From this perspective farming methods are acceptable if they keep animals healthy and producing well, even if living conditions are barren or restricted. A second view, common among critics of intensive agriculture, is that animals should be provided more natural living conditions and be able to express their normal behavior. A third focuses on the animal's feelings and emotions (affective states) such as pain. From this perspective methods of animal care can be evaluated by how much suffering or pleasure they provide the animals.

These different views can sometimes lead to different conclusions about how to promote animal welfare; the first view ('biological functioning') may favor cages for laying hens because of the reduced risk of disease transmission in cage systems, whereas the second view ('natural living') would favor less restrictive housing that permits hens to express their natural behavior. In many cases, the three views will concur. For example, if a sow in hot weather is allowed to wallow, this should improve her welfare by all three criteria: heat stress will be reduced (biological functioning), wallowing is the sow's natural means of thermoregulation (natural living), and the sow will feel less uncomfortable (affective states). Thus, the three views often serve as complementary starting points for identifying and solving animal welfare problems. All three views have also stimulated scientific research on animal welfare.

Animal welfare research

¹ This paper is an abridged version of a presentation entitled: Fraser D & Weary DM 2004. The culture and science of animal welfare. AquaNet Fish Welfare Workshop, Campbell River, BC, September 27, 2004.

Biological functioning

The physical health of an animal is one of the most basic indicators of welfare. For example, dairy cattle housed in free-stall systems often develop lesions on their legs. The prevalence of these hock lesions varies among herds, but lesions are most numerous on farms using geotextile mattresses as bedding, whereas fewer lesions were seen among cows bedded on sawdust or sand. Cows also have a strong preference for deeper bedding (suggesting that they find bedding more comfortable than bare mattresses), and they spend more time resting when kept in well-bedded stalls. Hence, an initial observation based on biological functioning helped identify housing that also appears to promote greater comfort.

Natural living

Although a high level of health is an important element of animal welfare, many people feel that acceptable welfare requires other factors to be taken into account. The use of natural living criteria is an attempt to move beyond simple health measures, but the approach must be used with caution; natural environments includes many hardships such as cold weather, predators, and periodic food shortages. Nonetheless, the welfare of animals can often be improved by careful incorporation of certain elements of their natural behavior.

Dairy calf feeding methods provide an example of how permitting natural behavior can improve animal welfare. On many dairy farms, calves are separated from their mothers within the first day and are then fed milk by bucket in two large meals per day at a fixed percentage of body weight. Under natural conditions, cows nurse their calves many times per day in smaller meals. Although it is often not feasible to leave calves with the cow on modern dairy farms, changed feeding practices can allow calves more natural feeding. When calves are allowed *ad libitum* access to a milk feeder, they consume many relatively small meals per day, allowing them to drink much more milk without developing digestive problems. If they are fed by sucking an artificial teat rather than drinking from a bucket, the total time spent feeding is increased, especially if the teat has a small orifice. Calves fed in this way drink more milk and gain appreciably more weight than those fed by bucket twice per day. Thus attention to the natural behavior of animals can provide a starting point for changing production methods that favor animal welfare.

Affective states

For many people, unpleasant affective states such as fear, pain, hunger, and distress are among the most compelling welfare concerns, so the development of measures to assess affective states in animals is a key component of farm animal welfare research. In this presentation I will cover some approaches to assessing pain in farm animals. Methods of assessing other subjective states in animals will be addressed in more detail during Ian Duncan's presentation later in this meeting.

Conclusions

- To summarize, three different views of what constitutes acceptable animal welfare have emerged, one based on basic biological functioning, one on the affective states of animals, and one that uses natural living as the fundamental criterion. Each of these can lead to valuable scientific approaches to assessing and improving the welfare of animals. One of the cutting-edge problems, for both science and society, is how to resolve the conflict when different approaches lead to different conclusions.

INVESTIGATING THE FEELINGS OF AGRICULTURAL ANIMALS

Ian J.H. Duncan

Department of Animal & Poultry Science, University of Guelph

It will be argued that animal welfare is inextricably connected with sentience or how animals feel, i.e. with the third view expressed in the previous paper. Organisms that are insentient, such as bacteria, protozoa and many of the lower invertebrates, have no welfare. The vertebrates and some of the higher invertebrates are sentient i.e. they subjectively experience feelings, and it is these feelings that welfare is all about.

Welfare is reduced when animals experience states of suffering. Since states of suffering are subjective states or feelings, they are not directly accessible to scientific investigation. However, careful observation of an animal's behavior can often give a good indication of whether or not it is suffering. In addition, techniques are currently being developed whereby states of suffering can be investigated indirectly. The animal can be 'asked' what it feels about the conditions under which it is kept and the procedures to which it is subjected. With some ingenuity it might be possible to find out how negative a particular state of suffering is to the animal. The major states of suffering that have been investigated in farm animals are pain and discomfort, fear, deprivation, frustration and conflict. We should also be open to the possibility that some species (e.g. fish species) may experience states of suffering not experienced by human beings. There is also a growing opinion that good welfare is more than just the absence of suffering, and that at least the mammals and birds of the vertebrates are able to experience pleasure. To date, there have not been many studies on animal pleasure and this requires to be rectified.

Some examples of different states of suffering that are commonly experienced by farm animals will be discussed and the techniques being developed to investigate them will be described.

Although our understanding of states suffering has increased enormously in recent years, there remain significant gaps in our knowledge. For example, although 'boredom' is often alleged to reduce welfare under intensive husbandry

conditions, we know little about this state of suffering. We also need to know more about where, on the phylogenetic scale, does sentience emerge? Should a bee-keeper be concerned about the welfare of her bees? More investigation is also required on the ontogenesis of suffering. Do neonates actually suffer less? Should we be concerned about the welfare of animals during fetal development? These questions and other welfare research needs will be considered.

Agricultural Animal Housing and Husbandry Standards for Biomedical and Food/Fiber Animals

Temple Grandin
Dept. of Animal Science
Colorado State University

The restaurant audits of animal welfare at slaughter plants have been extremely effective for improving conditions. In 1996 only 30% of the plants were capable of stunning 95% of the cattle with one shot. Now over 90% of the plants are capable of doing this (Grandin, 1998, 2005a). The main cause of poor stunning was lack of stunner maintenance. Electric rod use has dropped from 100% of the cattle to 21% (Grandin, 2005a). In the heavily audited plants where more than one restaurant conducts audits, 0% of the cattle or pigs fell down during handling in 2003, 2004, and 2005 in a sample of over 6,000 cattle and 3,000 pigs.

One of the reasons the audit program was so effective is because it used a very simple objective numerical scoring system where five core criteria were measured. To pass the audit, the plant had to achieve acceptable scores on ALL FIVE criteria. They were: 1) percentage of animals stunned on the first attempt, 2) percentage rendered insensible (had to be 100%), 3) percentage falling during handling, 4) percentage vocalizing during handling, 5) percentage moved with no electric prod. There were also five acts of abuse that would also be an automatic failure. See the American Meat Institute Guidelines (Grandin, 2005b) for the complete audit.

This successful auditing program used the HACCP (Hazard Analysis Critical Control Point) principles that are used in food safety. The concept is very simple: there are certain core criteria which have to be performed to the level of a clearly defined standard. If any one of the core criteria is not up to the standard, the entire audit fails. An effective core criterion measures more than one problem. For example, a high percentage of cattle falling down could be caused by poorly trained employees on slick floors. Instead of telling a plant how to build nonslip flooring, the bad outcome of slick floors is measured.

Some producer groups such as the National Chicken Council have made the mistake of using a scoring system that weights a minor paperwork violation the same as something really bad such as kicking and throwing chickens or live birds in the scaulder at the processing plants. In my consulting work with

restaurant clients, we use the chicken council audit form and have added some automatic failure items.

Principles of a Successful Auditing Program

1. The emphasis is on directly observable things instead of looking at paperwork.
2. Clearly worded guidelines. The words adequate, sufficient, and properly should be banned. One person's idea of proper handling may be considered abusive by somebody else. An example of a clearly worded guideline is "all the pigs must have enough space on the vehicle to lie down at the same time without being on top of each other.
3. Core criteria that would severely compromise animal welfare must all be passed to pass the audit. Later in this paper I will list items that should be grounds for an automatic failure. For some items, such as throwing animals or other well defined abusive acts, there would be a zero tolerance; but for other items, a perfect score would not be required. Instead, a high standard of performance would be required. For example, the AMI guidelines allow 1% of the cattle or pigs to fall during handling. However, where people start measuring things, performance gets much better. The really good plants now have 0% falls out of several thousand cattle.
4. Manage What You Measure – this prevents bad from becoming normal. When numerical scoring is used, you can tell if your practices are getting better or worse. One example would be lameness. Is the percentage of lame dairy cows on your farm, getting better or getting worse? Another big advantage is that many arguments between auditors and facilities are prevented because they know what numbers they have to meet.

Important Core Criteria Which Must be Passed to Pass the ENTIRE Audit

Some criteria are simple yes/no scoring for the entire facility. Experts will need to determine what these criteria should be. An example of housing that would be an automatic failure for a whole foods audit would be the use of sow gestation stalls. The second type of criteria allows some imperfection and is not zero tolerance. Examples are: Ammonia levels in a room or the percentage of lame animals. Experts would determine the cutoff point of failure.

Examples of Zero Tolerance Core Criteria – Automatic Audit Failure

1. Abusive animal handling – defined in (Grandin 2005b)

2. Animal is housed in a space so small that it is forced to lie in sternal recumbency (some U.S. farms have gestation stalls so narrow they would fail this).
3. Lack of functioning euthanasia equipment or drugs that are approved by AVMA or ALAAC for euthanasia.
4. Restraint devices are used for animal housing.

We need specific definitions for core species. Examples of Core Criteria which have to be maintained at a high standard but not zero tolerance. Automatic failure if below the standard. Experts would determine the cut off point automatic failure.

1. Ammonia levels in indoor housing.
2. Percentage of skinny animals with a body score of 1 or 2 (use industry scoring systems).
3. Percentage of lame animals (use industry scoring methods).
4. Percentage of animals with obvious infirmities. Specific lists need to be made for each species. Example, would be advanced cancer eye in cattle or swellings in the legs of dairy cattle.
5. Percentage of animals with heat stress symptoms. Example – count pants per minute.
6. Percentage of dirty animals (use industry scoring methods).
7. Percentage of animals doing stereotypies or other abnormal behavior definitions are needed for each species along with measurement methods.
8. Percentage of animals trained to voluntarily cooperate with veterinary and research procedures. When small numbers of pigs are used in biomedical research, they all should be trained to cooperate. Experts need to develop standards. For primates and dogs, training should be standard. Training is often not practical for rodents or large number of farm animals.

Transport and Handling Measurements (all scores per animal)

- Percentage of bruises
- Percentage of broken wings (poultry)
- Percentage of death losses
- Percentage of non-ambulatory (cannot walk)
- Percentage that fall during handling (1% or less)
- Percentage moved with electric prods (1% or less for research)
- Percentage that run into fences or gates (1% or less)
- Percentage mis-caught in the squeeze chute (half out the head gate)

- Percentage of cattle that vocalize in direct response to being caught in a squeeze chute. Indication of pinching or too much pressure.
- Space requirements for transport

In the meat industry, the managers who did internal audits of handling and stunning had better conditions than places that did not do internal audits. Managers who use agricultural animals for research should conduct internal audits. Top management that believes in good welfare is essential. During the first two years of the restraint audits in 1999 and 2000, three plant managers were fired out of 75 beef and pork plants due to failed audits. The new managers quickly corrected problems in the plants. Another finding was that some employees should not be handling animals. In many plants, one or more employees had to be removed from jobs handling animals. I hope this paper will give you some ideas on how to apply these successful principles to research animals.

Grandin, T. Objective scoring of animal handling and stunning practices in slaughter plants. 1998a. J. Amer. Vet. Med. Assoc. 212:30-39.

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Grandin, T. 2005a. Maintenance of good animal welfare standards in beef slaughter plants by using of auditory programs. J. Amer. Vet. Med. Assoc. 226:370-378.

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Breakout session on Environmental Enrichment for Swine

E. G. Patterson-Kane

Linda M. Panepinto

Effective enrichment:



- 1 Enhances the animal's welfare**
- 2 Redirects problem behavior and prompts natural behavior**
- 3 Supports the development normal behavioral and**

physical systems
 4 Supports calm and effective human-animal interactions

TYPE	EXAMPLES
Social	Stable compatible groups, regular positive human contact
Rooting	Straw or shavings on solid floors, compost in racks over slatted floors ⁺
manipulation (chewable, deformable, destructible*)	Regularly renewed deformable or destructible objects (branches, cloth, ropes, rubbery objects etc).
Feeding and foraging (ingestible, odorous*)	Straw, treat foods such as fruit, strewn foods, food balls
Comfort	Retreat areas, straw, rubber or dirt surfaces; may include nesting box “clean areas” with deep bedding material.
Spontaneous activity	Open areas, tractable surfaces, allowing for demarcation of space (dunging, resting and activity areas)
Temperature regulation	Piglet heat lamps/cribs, bedding, water cooling. Some miniature strains require supplemental heating.

Things to Consider

- Design enrichment from the animal’s point of view--avoid ‘window dressing’ with items the animals do not use.
- Effective enrichment should make your job easier and/or more enjoyable.
- Make enrichment part of the husbandry routine (job descriptions and budget).
- Define what enrichment ‘is’ so that different methods can be critically assessed.
- Ingenious use of existing resources and local materials may be more effective (and economical) than using commercial enrichment devices.



Selected Papers:

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[†]Beattie, V. E., Sneddon, I. A., Walker, N. & Weatherup, R. N. (2001). Environmental enrichment of intensive pig housing using spent mushroom compost. *British Society of Animal Science*, 72, 35-42.

Tuytens, F. A. M. (2005) The importance of straw for pig and cattle welfare: a review. *Applied Animal Behaviour Science*, 92, 261-282.

^{*}Van de Weerd, H. A., Docking, C. M., Day, J. E. L., Avery, P. J. & Edwards, S. A. (2003). A systemic approach towards developing environmental enrichment for pigs. *Applied Animal Behaviour Science*, 84, 101-118.

Panepinto, L.M., 2001, Environmental enrichment in miniature and microswine, *CALAS/ACSAL*, 35; #1, 28-29.

*E. G. Patterson-Kane--rattitude@gmail.com
Linda M. Panepinto--LPanepinto@netscape.com*