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Dehorning Pain: *Can We Make it Better for Them?*

By Kimberly Sheppard

You might not know it by looking at them, but dairy cows are horned animals. The horns that they would grow, however, must be removed at a young age to prevent injury – to both herd-mates and handlers. A common practice throughout the world, virtually all dairy animals have this done.

Although the ultimate goal of dehorning is to protect the welfare of everyone involved, the procedure itself causes immediate and longer-term pain.

The procedure, which typically involves killing the tissue at the immature horn bud (or less frequently, amputating a mature horn) is referred to as disbudding or dehorning. Although the ultimate goal of dehorning is to protect the welfare of everyone involved, the procedure itself causes immediate and longer-term pain. A local anaesthetic is sometimes used to help with the immediate pain, but rarely is anything done to mitigate the longer-term pain.

Anneliese Heinrich undertook a MSc project at the University of Guelph to evaluate how long the pain of dehorning lasts, and whether a non-steroidal anti-inflammatory drug called meloxicam could measurably help. Meloxicam was chosen due to its strong anti-inflammatory and analgesic properties that, with just one dose, last around 26 hours.

Together with her thesis advisors Drs. Suzanne Millman and Todd Duffield, Heinrich decided to look at three different areas that can aid in the assessment of pain – physiology, behaviour and pain threshold.

Heinrich taking the heart rate of one of her research subjects



Sixty Holstein heifer calves between six and twelve weeks of age were used for the study. All calves were dehorned using an electric cauterizing iron, which destroys live tissue while simultaneously stopping any bleeding. This is the most common method used in Ontario. Prior to dehorning, all calves were given a local anesthetic, lidocaine, which has an effect similar to a dental freezing. Half the calves were also given an injection of meloxicam at a dosage of 0.5mg/kg and the other half (control calves) received placebo injections of saline solution.

Physiological measurements included levels of the stress hormone cortisol, heart rate and respiratory rate. Six hours after dehorning, when the freezing was expected to wear off and the calves would feel pain from the dehorning surgery, calves that did not receive meloxicam showed a peak in cortisol. Heinrich says that the reduced stress response in meloxicam-treated calves is probably due to differences in pain.

All calves experienced higher heart rates and respiratory rates after dehorning, but these were higher in placebo-treated calves than calves given meloxicam. Heart and respiratory rate remained elevated in the control group, but not the meloxicam group, for 24 hours after dehorning – suggesting that the control calves were generally stressed and/or uncomfortable throughout this time.

Pain-related behaviour was assessed using digital video recordings, and included ear flicks, tail flicks, head shakes, head rubs, foot stamps, and putting the head through the pen bars. For all calves, dehorning caused increases in these behaviours, which persisted for 44 hours when observations were discontinued. These results suggest that the discomfort associated with dehorning probably lasts at least this long.

As for differences in behaviour associated with the use of a pain medication, once again, meloxicam offered a benefit. Calves treated with meloxicam showed fewer pain-related behaviours and for a shorter duration of time than placebo-treated calves. Meloxicam-treated calves were also less restless during the first few hours after dehorning, and ate more on the day following.

A novel approach was used for the final assessment. This was a pain sensitivity test, using a pressure algometer to determine how much pressure an animal will tolerate before the animal withdraws. Four hours after dehorning, the rubber tip of the algometer was placed directly above, below, and to each side of the horn bud. The amount of pressure that could be applied before the calf withdrew its head was compared with the calf's response before dehorning. All calves were more sensitive

to the algometer after dehorning, but meloxicam-treated calves withstood significantly more pressure than the control group, indicating that they were less sensitive to pain at the time of the test.



Anneliese Heinrich and dehorned calf

From all the measures used, meloxicam seems to be a very good medication for the treatment of pain following dehorning, with effects that last longer than other pain medications studied to date. However, meloxicam is not yet approved for use in bovines in North America, although it has been approved for use in bovines in Europe. Meloxicam is approved for post-operative pain in cats and dogs in Canada.

The second constraint for its use on farm is cost. Further research is needed to determine if provision of meloxicam would be cost-effective for producers and also which is the best method of administering the drug. Just as with any welfare-added product, this is partly dependent on willingness of consumers to pay for the increased labour and drug costs of the treatment. †

Funding for this research was generously provided by Boehringer-Ingelheim Canada, Natural Sciences and Engineering Research Council of Canada, Canadian Foundation for Innovation and Ontario Ministry of Research and Innovation.

Farm Animal Welfare Here and Abroad

– *How are we doing?*

By Kimberly Sheppard

So, how are we doing as a country on animal welfare? That question is much easier to answer if you're able to compare the current state of animal welfare in Canada with elsewhere in the world.

80% of European Union (EU) citizens say animal welfare is an important issue, and 89% think that imported products should be produced under the same animal welfare conditions as those originating in the EU.

An opportunity for doing just that was offered by the National Farm Animal Care Council (NFACC), in its first National Farm Animal Care and Welfare Conference, held in Ottawa on September 20th–21st, 2007. Speakers representing Canada, the United States, Europe and New Zealand covered a broad view on animal welfare initiatives underway both domestically and internationally – with insights on trends for the future.

And what exactly is going on out there? The good news is – the approaches being undertaken in an attempt to improve the welfare of farm animals are vast and varied. The challenge is that there are so many. Voluntary efforts include guidelines, standards and quality assurance schemes set by private industry, as well as certification programs offered by animal protection organizations. Involuntary efforts involve government legislation and law.

Restaurant chains and grocery retailers have also come on board – sourcing welfare-friendly products only from producers that meet the establishment's own, sometimes proprietary, standards. With such a variety of 'welfare quality assurance' strategies being offered, it is clear that a baseline for developing welfare standards is required. In order to generate consumer confidence in the system, this baseline must be recognized not only within individual countries, but globally as well, since international trade becomes an issue.

The need for a global baseline becomes even more apparent when considering results from a 2006 Eurobarometer Survey, which found that 80% of European Union (EU) citizens

say animal welfare is an important issue, and 89% think that imported products should be produced under the same animal welfare conditions as those originating in the EU. However, this is not the case presently.

Because food can originate from a variety of countries that may have different welfare guidelines in place, one area that would greatly improve consumer confidence and decision making is labelling of products – but this is also being done on a limited basis. Cornelius Rhein, Legislative Officer with the European Commission, said that consumers find it difficult to find information on product sourcing.

Labelling is important because it promotes welfare-added products and facilitates choice between basic and higher standards, said Rhein. It also offers real benefits to producers via market forces. In order for labelling to work, however, it must be transparent (clear to the consumer), science based, and must follow a common framework – otherwise consumers become confused by the many options and how they compare.

One of the initiatives that has been undertaken in the EU to work towards a common framework is the 'Welfare Quality Project.' One Canadian, Dr. David Frasier, University of British Columbia, sits on Welfare Quality Scientific Board. Among the objectives of the Welfare Quality Project is the development of an animal welfare information standard, increased international awareness on animal welfare with an aim to facilitate sustainable trade, and creation of opportunities for producers.

John Webster, Professor Emeritus, University of Bristol, reiterated that animal welfare sells best when it is part of a package of added value, including value for the farmer. Webster has witnessed added welfare resulting in greater pride for farmers, and has heard comments such as "I've started to enjoy farming again."

In Canada, just as in other developed countries, some animal welfare initiatives are underway. Several commodity groups have animal care assessment programs in place or in development, and the British Columbia Society for the Prevention of Cruelty to Animals has started a labelling program called "SPCA Certified." While these initiatives are a step in the right direction, the need for internationally accepted and recognized standards has never been more pressing.

The Canadian government could lend support to this area by being involved in the development and implementation of such standards. However, Shelagh MacDonald, Program Director for the Canadian Federation of Humane Societies, stated that there has been a lack of attention to animal welfare by the Canadian federal government.

Canada needs a comprehensive national strategy for health and welfare, said MacDonald, and a funding strategy to support this. She also pointed out that governments in New Zealand, Australia, and Europe are paying much more

attention to animal welfare, and that the United Kingdom even has a farm animal welfare council to advise government. So, how does Canada fare on the animal welfare front, overall? While not a world leader, Canada is one of the key players in a global challenge to improve animal welfare in a strategic, measurable manner. John Webster summarized the challenge as one of awareness, education, and promotion of farm animal welfare. For the animals this means increased productivity and welfare; for consumers, greater trust and satisfaction; and for producers more pride and overall - survival. †

Public Lectures

Bellynosing in piglets – *Why they do it, and what does it say about their welfare?*

By Kimberly Sheppard

Piglets on swine farms have been showing strange behaviour. First reported back in the 1970's and still occurring today, the behaviour involves piglets rubbing their snouts rhythmically up and down against the bellies of other piglets – sometimes to the point of causing irritation and lesions. A common term used to describe the behaviour is “bellynosing.”

Dr. Stephanie Torrey, Swine Welfare and Behaviour Specialist with Agriculture and Agri-Food Canada, gave an overview of bellynosing in the Animal Behaviour and Welfare Seminar Series. As a graduate of the animal welfare program at the University of Guelph, Torrey became an expert on this peculiar behaviour while investigating various aspects of it throughout her PhD, under the advisement of Dr. Tina Widowski.

So what is going on here? First of all,

this behaviour only seems to develop under certain circumstances. Many studies have shown that the earlier piglets are weaned – that is, removed from their dams (moms) and placed in weaning pens with piglets from other litters – the higher the prevalence of bellynosing. Weaning takes place much earlier in a production setting (around three weeks) than would occur naturally

(eleven or more weeks), placing stress on the piglets.

Age at weaning is not the only factor involved in bellynosing, however. Regardless of weaning age, some piglets don't bellynose at all, while some spend a little bit of time doing it, and some spend a lot. It has also been noted that the piglets that bellynose also grow more slowly after weaning.

It's been established that an early weaning age predisposes piglets to begin bellynosing – but does this behaviour serve a purpose or indicate a possible welfare problem? Suggestions

Studies have shown that 4-5% of recipient piglets in commercial herds have severe redness or irritation on their bellies, with up to 88% having some form of lesion.



This piglet at the centre is bellynosing – this raises welfare concerns

for causation include suckling and foraging motivations, hunger, diet quality, social stress and lack of environmental complexity. It doesn't appear to be caused by social stress – weaned littermates are just as apt to bellynose as strangers.

Piglets are “nosey” animals – the snout is used to gain food – first by massaging their mother's udder, and later by rooting and foraging for food. But, there is often nothing to nose at in a weaning pen except for other piglets. Several studies have shown that providing straw reduces bellynosing. Others have found that provision of artificial nipples, udders, or other nosing devices reduces bellynosing. So, do pigs just want to nose at something, or are they mock “nursing”, or possibly hungry?

Bellynosing certainly looks like sucking behaviour. Just as when piglets are massaging the udder for milk, the behaviour involves an up-and-down massaging motion of the snout on bellies of other piglets. Torrey did a study to investigate whether piglets that spend more time suckling become the bellynosers after weaning. After observing seven litters of piglets from nursing through twenty-one days after weaning, Torrey determined that belly nosers spend less time suckling on the sow. They eat less and grow more slowly. Torrey says that these piglets may be trying to adopt a juvenile form of ingestion. If a piglet is weaned at an early stage of its ingestive development, it will still be motivated to suckle. This suckling motivation, if not accommodated through the provision of teats or other non-nutritive devices, will lead to bellynosing.

Bellynosing may, in Torrey's opinion, also serve a function. Because pacifier sucking in neonatal human infants aids in gastrointestinal motility, Torrey thinks that bellynosing may serve a similar function in piglets. She thinks it may decrease indigestion in piglets that are having difficulty digesting solid food when their bellies are not used to it. Bellynosing may also have pain-relieving properties, says Torrey, and may also help to stimulate receptors in the snout.

But, is bellynosing a welfare concern? Torrey believes it is. Studies have shown that 4-5% of recipient piglets in commercial herds have severe redness or irritation on their bellies, with up to 88% having some form of lesion. As for the bellynosers – the behaviour seems to be related to hunger, slow growth rates and lack of feeding behaviour. It may

also indicate frustration due to lack of an outlet for suckling and nosing, and may result in aggression if the recipient isn't willing to be bellynosed.

Torrey feels that the problem of bellynosing needs to be addressed. A first step in accomplishing this, she says, is to increase the weaning age. Although the European Union restricts weaning of piglets at less than four weeks of age, North American operations wean pigs at or under three weeks of age. Provision of suckling or nosing devices in the post-weaning environment can also reduce its prevalence, as would inducing more feeding behaviour amongst weaned piglets. Instituting even a few of these changes in production practices would help to improve the welfare of both the bellynosers and their recipients. †

Students

Where are they now?

Penny Lawlis, MSc. 2003



Penny Lawlis completed her Master of Science degree at the University of Guelph in 2003, which she earned through part-time studies while working for the Ontario Ministry of Agriculture, Food and Rural

Affairs (OMAFRA).

Lawlis began her career with OMAFRA as an inspector under the Riding Horse Establishments Act and the Animals for Research Act. She was the Chair of the development committee for the Code of Practice for Horses. Later, her focus shifted to on-farm welfare of farm animals and she was involved in the development of several Codes of Practice for the Care and Handling of Farm Animals. She was the secretary of the Expert Committee on Farm Animal Welfare Behaviour for many years.

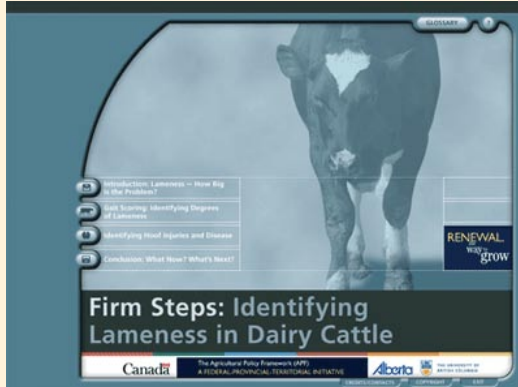
Lawlis' major project for her Masters degree was to design a course on the practical assessment of animal welfare, supervised by Dr. Ian Duncan. As a result of her MSc project, Lawlis became involved in the development of the On-farm Animal Welfare Assessment Tool for the

Canadian Pork Council and a Broiler Chicken-Catching Course. Lawlis says that Drs. Tina Widowski and Temple Grandin provided much inspiration and support during her professional development.

Interest in the science of animal welfare assessment also led Lawlis to her current role as a Humane Standards Officer with the Animal Health and Welfare Branch of OMAFRA. In this position, a major part of her job is to assess the animal welfare of all types of livestock during transport, at slaughter plants and auction markets as well as designing and delivering courses in animal behaviour and handling. In addition, Lawlis is involved in several research projects investigating the practicality of novel euthanasia techniques and the transportation of pigs in collaboration with Dr. Tina Widowski.

As U of G's Department of Animal and Poultry Science moves forward with its new non-thesis Masters program in the field of animal behaviour and welfare (see page 8), it seems logical that Lawlis dust off the course she designed and offer it as part of this new program. This graduate level course focuses on the practical assessment of animal welfare, and explores the underlying concepts and steps involved in developing animal care auditing/assessment schemes for industry and regulatory bodies. It will be offered in January 2009.

In the news



Firm Steps: *Identifying Lameness in Dairy Cattle*

Dairy cow lameness is one of the top welfare issues associated with dairy farming today. It is estimated that 20-30% of dairy cows are lame at least once – but, assessing lameness in dairy cows can be tricky business. It can be difficult to know exactly what to look for, or sometimes, to even realize that an issue has cropped up unless the lameness is severe and very obvious.

A new CD-ROM package has been developed by Alberta Agriculture and Food to assist dairy farmers in detecting and treating lameness early, reducing severity and improving overall welfare. The CD-ROM includes info on gait scoring, showing actual footage of what to look for, and offers advice on management practices to keep lameness under control.

To order the package, called “Firm Steps: Identifying Lameness in Dairy Cattle” call 1-800-292-5697. The package costs \$20.

Students

The CCSAW chicks had the “Royal Suite” at the Royal Agricultural Winter Fair!!



Emily Toth, CCSAW Student Chapter Vice president (right), and Megan Mackenzie-Bell, CCSAW Student Chapter member, explain the science of animal welfare to interested fair-goers

Each year CCSAW has a booth at the Royal Agricultural Winter fair in Toronto. At “The Royal”, student volunteers and CCSAW staff spend 10 days talking to the public about animal welfare science, the animal welfare program at U of G, and the various projects underway to improve the lives of animals we use every day.

One component of our educational display is the “preference test” wherein 12 chicks demonstrate that they show clear preferences for certain types of environments. The chicks stay at the fair for the full 10 days. Because they are there with the University of Guelph, strict animal care guidelines must be followed, based on an Animal Utilization Protocol that is reviewed and approved by U of G’s Animal Care Committee.

Provisions for the chicks include having an individual trained in poultry handling on site each day to perform daily maintenance and health checks, and a secure overnight housing area for the chicks.

However, such accommodations are hard to come by at the Royal – virtually all rooms are in use. This year, the President of the Royal Winter Fair himself, Dr. Rob McLaughlin, offered up his own office to our chicks each night! CCSAW would like to thank Dr. McLaughlin for providing the “Royal Suite” to our chicks at the 2007 Royal Winter Fair! 🐔

Observing social behaviour can aid in early detection of illness

By Janet Higginson

Many behavioural changes can be observed when an animal is ill. These include anorexia, lethargy, depression, as well as decreased thirst and activity. These changes in behavioural range occur across a variety of species and are thought to be an adaptive complement to the innate immune response. Behaviour changes are commonly used as clinical signs for diagnosing disease, but may also be important for the welfare of animals during convalescence.

Research recently completed by MSc student Michael Brunt in the department of Population Medicine, under the supervision of Dr. Suzanne Millman, examined the behavioural changes of dogs during gastrointestinal illness associated



Michael Brunt, studying the effects of illness on social behaviour in dogs

with *Fusarium* mycotoxin. This mycotoxin can be found in contaminated grains and has been associated with pet food-related illnesses. In particular, Brunt was interested in exploring the effects of illness on social behaviour of dogs.

Twelve female beagles were housed in individual pens with food, water, and resting areas available, as well as indirect contact with dogs housed beside or across from them. All dogs received each of three treatment diets for 14 days: a control diet, a diet formulated with grains contaminated with *Fusarium* mycotoxins and a *Fusarium*-contaminated diet that included a polymeric glucomannan mycotoxin adsorbent, which was expected to reduce the toxic effects. Four-minute tests of social motivation were conducted daily, during which each dog was released from its home pen and allowed to move freely in the central walkway of the room. An observer, who was blind to the treatment groups, observed through a


window outside the room and recorded the dog's exploratory behaviour and attempted social interactions with the dogs in the other pens.

Mild gastrointestinal illness was associated with diets containing *Fusarium* and dogs performed significantly fewer social interactions when they were fed this diet. When dogs

For pet owners, attention to changes in a dog's sociability and playfulness may be helpful for early diagnosis of disease and for addressing the needs of dogs during convalescence.

were fed the *Fusarium* diets, they displayed fewer assertive social behaviours such as making eye contact with the other dogs in the room and putting their feet or noses through the bars of other kennels. However, behaviours that are more closely associated with exploratory motivation, such as moving around the room and sniffing the gutter areas, were not affected by the *Fusarium* diet.

The results from this study could have an impact on the welfare of both laboratory and shelter dogs as tools for welfare and health assessments. For pet owners, attention to changes in a dog's sociability and playfulness may be helpful for early diagnosis of disease and for addressing the needs of dogs during convalescence.

Collaborators on this project include Dr. Trevor Smith and Maxwell Yeung, Dept. of Animal & Poultry Science and Dr. Patricia Turner, Pathobiology. Funding was generously provided by the Natural Sciences and Engineering Research Council of Canada, Canadian Foundation for Innovation and Ontario Innovations Trust, and Alltech Inc. of Lexington, KY. 

Graduate Training in Animal Welfare – *We now have even more to offer!*

Graduate training in animal welfare is growing at the University of Guelph. For the first time, beginning in September 2008, the Campbell Centre for the Study of Animal Welfare is offering a non-thesis Masters (MSc.) Degree in the field of animal behaviour and welfare, through the Department of Animal and Poultry Science.

This is great news for individuals who wish to gain a solid foundation in animal welfare education, but don't necessarily plan to carry on as research scientists or undertake doctoral studies. Previously, those wishing to undertake graduate studies in animal welfare were obligated to complete a major research project and produce a thesis.

While a research thesis remains the ideal option for many, the course-based MSc

program opens doors for those working in industry, government, veterinary medicine, animal care, or animal protection organizations.

“Many individuals are looking for advanced training on the current animal welfare issues, challenges, and solutions in their given fields – training that can be taken back to their place of employment and applied immediately”

says Tina Widowski, Director of the Campbell Centre. “The program is the first in North America to equip students to meet the needs of the various animal industries, by allowing them to rapidly

gain the skills necessary for a scientific career in the discipline of animal welfare.”

The MSc. in animal welfare will be a multidisciplinary program based on a core of graduate courses in animal welfare science with selected electives in the areas of food animal, lab animal, zoo animal, and equine sciences. Courses will be taught by faculty in the department of Animal and Poultry Science at the Ontario Agricultural College, together with faculty in the departments of Population Medicine and Pathobiology at the Ontario Veterinary College. †

For information on applying for this program, please visit: www.aps.uoguelph.ca and click on “Graduate” under Academic programs



Congratulations!!

Congratulations go out to Cindy Todd, who successfully defended her master's thesis: “Aspects of the prevention of neonatal calf diarrhea complex in dairy calves”. Todd is continuing on with a PhD in epidemiology and animal behaviour. She plans to evaluate the effects of feeding acidified milk to calves. Acidification helps to preserve the milk so that it can be offered to calves free-choice; Some claim this improves health and growth. Todd will be conducting this work with Dr.'s Suzanne Millman and Jan Sargeant.



The Campbell Centre for the **Study of Animal Welfare**

To learn about how you can support the centre or to join our e-mail list, go to: www.uoguelph.ca/csaw or write to:

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