Research Symposium

Ontario Veterinary College,
Pathobiology/AHL Building, Room 1800
May 2nd, 2012
9:00am – 5:00pm
ORAL PRESENTATIONS

9:00 Welcome

Session I – Improving Comfort, Health and Welfare

9:05 Pathogen identification and incidence rates of mastitis on organic and conventional dairy farms in Southern Ontario
Lena Levison*, Anita Tucker, Renée Bergeron, Herman Barkema and Trevor DeVries

9:25 Short Presentations

Effect of stall mattress compressibility of the activity, lying behaviour and cleanliness of dairy cows
Alexa Main*, Derek Haley, Todd Duffield, Cassandra Tucker and Nigel Cook

An investigation of sow lameness: a case study
Sarah Ahola*, Robert Friendship, and Tina Widowski

9:40 Elevated resting bunks improve the health and welfare of nursing mink
Lauren Dawson*, Margaret Quinton, Derek Haley and Georgia Mason

10:00 Injuries on tie-stall dairy farms and the relationship with lying time and stall base
Jessica Zaffino*, Clemence Nash and Derek Haley

10:20 Break

Session II – Improving the Procedures We Use to Care for Animals

10:50 A water sprinkling method to cool market pigs during summer transport
Jessica Fox*, Tina Widowski, Stephanie Torrey, Eleonora Nannoni, Renée Bergeron, Harold Gonyou, Jennifer Brown, Trever Crowe and Luigi Faucitano

11:10 Improving euthanasia on the farm: Testing the Zephyr-E for use as an alternative euthanasia technique for piglets from 3-9 kg
Teresa Casey-Trott*, Stephanie Nykamp, Patricia Turner, Suzanne Millman and Tina Widowski
11:30  **Short Presentations**

The effects of lidocaine and meloxicam on piglets during and post-castration  
Michelle Lam*, Derek Haley, Robert Friendship and Tina Widowski

Comparison of inter-observer agreement for different types of welfare measures using three animal welfare assessment protocols for swine  
Ashley Roberts*, Tina Widowski, Penny Lawlis and Renée Bergeron

11:45  **Investigation of the use of meloxicam for reducing pain associated with castration and tail-docking and improving performance in piglets**  
Ryan Tenbergen*, Robert Friendship, Glen Cassar and Derek Haley

12:05  **Using a Y-maze test to assess whether broiler breeder hens prefer a quantitatively or qualitatively restrictive diet**  
Krysta Morrissey*, Tina Widowski, Steve Leeson, Victoria Sandilands, Hank Classen and Stephanie Torrey

12:25  **Lunch and Posters**

1:30  **Keynote** - "For the love of dog: the welfare of animals we profess to love"  
Andrew Luescher, Purdue University

**Session III - An Inextricable Link: Behaviour and Welfare of Humans and Animals**

2:30  On the significance of puzzling behaviours: what do yawning and adult play tell us about horse welfare?  
Carole Fureix* and Martine Hausberger

2:50  **Short Presentation**

Linking donkey & human welfare in Maun, Botswana  
Martha Geiger and Alice Hovorka*

3:00  **Break**

3:30  The nature of social play and its relation to sexual behaviour in farmed mink  
Jamie Ahloy Dallaire*, Kaela Shaw, and Georgia Mason

3:50  **Short Presentations**

Improving enrichment practices for laboratory mice  
Michael Walker* and Georgia Mason

Assessment of beef cattle temperament on farms  
Tara Jones*, Joseph Stookey, Derek Haley, and Stephen Miller

4:05  **Identifying subtypes of inactivity that indicate poor welfare in captive mink**  
Rebecca Meagher* and Georgia Mason
4:25 Short Presentations

Location! Location! Location! The effect of cage size and density on the use of nest boxes in large furnished cages
Michelle Hunniford, Linda Caston, Stephanie Torrey and Tina Widowski

Assessing foraging and dustbathing behaviours of laying hens in two cage sizes and densities in furnished cages
Eugenia Herwig and Tina Widowski

4:40 Wrap up and student awards

POSTER PRESENTATIONS

Plucking behaviour in companion parrots: Do species differ in their intrinsic susceptibilities, and if so, why?
Heather McDonald Kinkaid*, Daniel Mills, Steve Nichols, Rebecca Meagher and Georgia Mason

Male mink raised with simple environmental enrichments show improved copulation performance in adulthood
Kaela Shaw*, Jamie Dallaire, Rebecca Meagher and Georgia Mason

Investigation of the use of meloxicam post-farrowing for improving sow performance and reducing pain
Ryan Tenbergen*, Robert Friendship, Glen Cassar, Maria Amezcua and Derek Haley

Two different analgesics given prior to castration to relieve post-surgical pain in piglets
Ryan Tenbergen*, Robert Friendship, Glen Cassar and Derek Haley

Do I look scared? Exploring the use of anxiolytic drugs on fear responses of domestic laying hens
Stephanie Yue Cottee*, Kenner Rice and Tina Widowski

REGISTRATION: Registration and lunch are free although a donation of $10 for students and $20 for Faculty would be greatly appreciated to help cover costs (your donation can be made the morning of the symposium at the registration desk). Please pre-register no later than April 30th, to help us plan the catering.

To register, please visit www.uoguelph.ca/ccsaw
ABSTRACTS

Keynote lecture

For the love of dog: the welfare of animals we profess to love

Dr. Andrew Luescher, Professor Emeritus, Purdue University

Most commonly we think of animal welfare issues as arising from economic pressures. This talk will discuss welfare issues in species that are not of primary economic interest (although they are also exploited in that way), but supposedly are objects of our love and admiration, such as dogs, cats and pet birds, for example. Aside from competitions and satisfaction of personal pride, it is often people's attraction to the unusual and absurd that causes welfare concerns. The interest in deviations from normal is only natural but has resulted in the selection for features that are barely compatible with life. Extremes in size, hairlessness, colorations that go along with neurological deficits, crippled conformation and behavioral abnormalities are but a few examples of such traits. It is concluded that our attraction to and love for living beings is led astray by our self-centered desire to manipulate and distort nature to satisfy our whims.

Biography

Dr Andrew Luescher, is a veterinarian (Dr Med vet prakt, 1975; Dr Med vet, 1979; University of Zurich, Switzerland) with a PhD in applied animal behaviour (1984, University of Guelph). He is a Diplomate of both the American College of Veterinary Behaviorists, and the European College of Veterinary Behaviour Medicine (Companion Animals). Dr Luescher has been treating companion animals with behavioural problems for over 25 years, including clinical cases in dogs, cats, parrots, horses, and food animals. His special research interests include compulsive disorders, canine aggression, and behavioural development. His treatment regimens use scientific principles of behaviour and learning. He was a Faculty member in the Department of Clinical Studies, University of Guelph, and of the Department of Veterinary Clinical Sciences at Purdue University from which he recently officially retired, in 2011. Since that time Dr Luescher has been recognized with Professor Emeritus status at Purdue University. Dr Luescher is a popular speaker and teacher at academic and professional conferences on a variety of animal behaviour topics and currently he resides in his native Switzerland.
Pathogen identification and incidence rates of mastitis on organic and conventional dairy farms in Southern Ontario

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Mastitis is recognized as a major concern of the dairy industry, resulting in production losses, decreased milk quality and decreased cow welfare. Currently on 59 Southern Ontario dairy farms (18 certified organic, 12 conventional with pasture for lactating cows and 29 conventional without pasture) milking approximately 3500 cows in total, a project is underway to survey key aspects of housing systems, producer management practices (such as alternatives to drug use in organic herds), health and welfare of lactating cattle and investigate variations in milk composition. One specific objective of the project is to collect and analyze producer identified clinical mastitis samples with the intent of identifying incidence rates and predominant pathogen types. A sampling protocol was reviewed with all producers at the initial farm visit to standardize case definition and sampling techniques. Clinical mastitis was defined as any change to the normal appearance of milk (this could be flakes, clots, blood, or watery consistency), from one or more quarters. Producers were asked to record cow identification, date sample collected, quarter affected and a mastitis score to indicate infection severity. A single sample was to be taken from every infected quarter. Sample collection began March 2011. In the first 30 weeks of the study 551 mastitis samples have been submitted from 464 cows. Well-defined pathogen identification was possible in 71% of samples, of which 70% had sufficient bacterial growth to cause an intra-mammary infection. Mastitis is a painful disease experienced by dairy cattle and management of mastitis can be difficult on any farm regardless of system type. This research aims to identify common pathogens and associated management practices implicated in mammary infections; this information will aid organic and conventional producers to select the most appropriate management strategies to maintain production and cow welfare.
Effect of stall mattress compressibility of the activity, lying behaviour and cleanliness of dairy cows

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The typical dairy cow in Canada spends the majority of her life indoors, in a man-made environment, which has effects on her behaviour and welfare. Assessing cow behaviour can be a useful tool for assessing their welfare and characteristics of their lying behaviour seem to be especially sensitive to welfare problems (e.g., pain, discomfort). On pasture or in comfortable indoor facilities, cattle may spend around 12 hours lying each day, while in uncomfortable intensive environments the cow’s lying time may decrease. Maximizing the time cows spend lying is critical for production, rest, comfort and welfare. Many factors influence the lying behaviour of the dairy cow, but one of the most critical is the softness of the surface on which she is resting. Stall surfaces should provide good cushion for the cow, which can be achieved by improving the base surface, the bedding, or both. Promat, Inc. has recently developed a stall mattress that is filled with a viscous gel substance that is quite highly cushioned. The objective of this project is to determine how the cow’s activity, lying behaviour and cleanliness are altered as stall surface compressibility changes from a firm to an intermediate to a very compressible surface. Our main hypotheses are that the most compressible Gel Mat stall surface increase lying time and result in shorter times for cows to transition from lying to standing. Observations of 24 dairy cows in tie-stalls will be collected over four months via video recording. Cows will spend 2 weeks each on four different stall flooring surfaces, 2 gel-filled mattresses varying in their compressibility, an aged Pasture Mat, and a standard solid rubber mat as a comparison. Cows will be washed when they switch flooring surface to observe changes in animal cleanliness. Animals will be fitted with a HOBO data logger to record general standing and lying behaviour, and will be video recorded 24h/day to observe specific behaviour patterns related to lying down and rising up. The results of this study will help to provide further insight to producers, scientists and production developers regarding how specific differences in stall surface compressibility impact the activity, lying behaviour and cleanliness of dairy cows.
An investigation of sow lameness: a case study

Sarah Ahola1*, Robert Friendship2, Tina Widowski1, Rocio Amezqua2 and Shannon Walsh3

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Animal welfare experts have ranked the observation of lameness as one of the most important animal-based welfare measurements in dairy cattle and pigs (Whay et al., 2005). Thus, acceptable ranges of lameness are outlined in many welfare audits and are weighed heavily on the results of the audit (Whay et al., 2005). Lameness causes pain and discomfort, compromising the animal’s welfare, making it difficult to perform essential tasks. Like many swine health problems lameness is complex and there are often multiple contributing factors, such as: poor flooring, poor pen/crate design, malnutrition, infection and more. Therefore it can indicate the presence of a wide range of problems within a herd. In sows, lameness is a common problem and is associated with premature culling and reduced reproductive performance. Lame sows have been shown to produce smaller litters including fewer pigs born alive and weaned (Berg, 2010). Furthermore, lifetime productivity is negatively affected, with lame sows producing on average fewer than 3 litters, compared to 4.5 litters for non-lame sows (Anil et al., 2004). The objective of this study is to investigate the prevalence and causes of lameness on a commercial swine farm with a history of the problem. The farm has sows with a wide range of leg and foot problems which could be attributed to lameness. Sows have overgrown dew claws, unequal toe sizes, sores, inflammation, lesions, hoof cracks and more. Thus to study the problem a subjective visual scoring system has been developed to evaluate leg and foot conformation, lesions, hoof cracks and other leg or foot injuries that could be causing lameness. Hopefully this work will provide information that can be used to identify causative factors, enabling the factors to be rectified and the problem ameliorated. In addition, economic losses associated with lameness will be documented. During the brief talk, additional details about the particular herd, the scoring system, timeline and the hopes of this study will be outlined.
Elevated resting bunks improve the health and welfare of nursing mink

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Unlike many other animals kept by humans, the young of farmed mink (*Neovison vison*) remain with their mothers beyond natural weaning age; this benefits their welfare. Their dams, however, can become stressed and at risk of the metabolic disease ‘nursing sickness’. European studies suggest that, given the opportunity, dams will use elevated structures to rest away from their kits during the nursing period. We therefore assessed the benefits of providing elevated resting bunks - a wire-mesh, semi-cylindrical tube attached to the cage ceiling - to 80 Black nursing females on a farm in Ontario. We expected resting bunks to be used increasingly with kit age, and that these structures would reduce stress and health problems during the nursing period; we also assessed whether they would compromise kit survival or growth. Control groups comprised nursing females without bunks (n=80), and barren females given bunks (n=40). Behaviour of females and their kits was observed for the final three weeks prior to dam-kit separation (kit ages 23 – 42 days), and health and production parameters were recorded immediately after separation. Dams with litters used bunks more as kits aged ($F_{6,143}=9.64, p<0.0001$), an effect not explained by seasonal changes in temperature ($F_{1,133}=2.15, p=0.1452$). Compared to nursing females without bunks, dams with bunks spent more time with their teats inaccessible to their kits, because of their bunk-use ($F_{1,119}=4.83, p=0.030$); they showed less stereotypic pacing ($F_{1,113}=7.20, p=0.008$); and, although they did not seem protected from nursing sickness, at the end of the lactation period they were less likely to have abnormal (swollen, red and/or crusty) teats ($X^2=4.044, p=0.04$), suggesting a lower incidence of mastitis. Their kits' suckling opportunities and time spent nursing were not reduced, however; nor did bunks negatively affect kit mortality or weights at 42 days (all $p>0.05$). Providing elevated resting bunks can thus ease the nursing and weaning period for mink mothers, seemingly without serious drawbacks for their kits. Future work will assess whether these bunks also reduce dam stress, as assessed via faecal corticosteroid metabolites, and whether enriching cages in other ways can also improve the nursing families’ welfare yet further.
Injuries on tie-stall dairy farms and the relationship with lying time and stall base

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Hock, knee and neck injuries on dairy cows are important indicators of welfare, management, and inadequate stall design. The objective of this study was to describe the nature of dairy cow injuries and identify relationships with lying time and stall base-type. Tie-stall farms were visited in Quebec (60) and Ontario (40). We sampled 40 Holstein cows per farm, scoring injury severity on a 4- or 3-point scale. Higher scores indicated greater severity. The same cows were used to calculate farm average lying time by recording their activity over 4, 24-h periods using electronic data loggers. The main stall-base type used on each farm was recorded. Among all limbs observed, injury score 0 was the most frequently assigned for knees and necks; score 0 and 2 were both assigned to 37% of the hocks observed. Using the higher of the two limb scores for hocks and knees, the mean herd prevalence (and range) of hock, knee and neck injuries (score >1) was 54% (6 - 93%), 42% (0 - 86%) and 30% (0 - 80%), respectively. Individual cow lying times ranged from 2.37 - 23.37 hrs/day. Herd average lying times ranged from 10.3 - 14.36 hrs/day. For all three injury locations, lying time did not differ between cows with and without an injury (hock: 12.23 and 12.74 hrs/day; knees: 12.3 and 12.54 hrs/day; neck: 12.3 and 12.5 hrs/day). For all three injury locations, farms with below median injury prevalence had a numerically higher mean herd lying time (hock: 12.72 ± 0.88 hrs/day; knee: 12.66 ± 0.82 hrs/day; neck: 12.6 ± 0.84 hrs/day) than farms with above median injury prevalence (hock: 12.16 ± 0.78 hrs/day; knee: 12.25 ± 0.88 hrs/day; neck: 12.22 ± 0.84 hrs/day). The mean herd injury prevalence among herds with a rubber mat stall base (hock: 61 ± 18%; knees: 52 ± 21%) was higher than that among herds with a mattress stall base (hock: 48 ± 18%; knees: 32 ± 20%). In conclusion, at both the cow and herd level, injuries did not impact lying time. Mattresses may have a sparing effect on injury to the hocks and knees compared to rubber mats, as seen with a lower injury level on mattress farms. The variation in injury prevalence across farms is both concerning and promising, and demonstrates that achieving low levels of these injuries is possible.
A water sprinkling method to cool market pigs during summer transport

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Heat stress in market pigs resulting from transport during hot weather is one of the leading causes of reduced transport welfare and increased in-transit death losses. It has been shown that water sprinkling during lairage decreases micro-climate and pig body temperatures and improves welfare, but there is no evidence of these effects during transport. The aim of this study was to observe if sprinkling pigs in trailers before and after transport decreased signs of heat stress. In each of 12 weeks from May to September 2011, 2 pot-belly trailers with 208 pigs per trailer were transported 2h to slaughter. One was outfitted with a sprinkler system that ran for 5min (~125 litres) before departure from the farm and before unloading at the plant. In each trailer, 4 test compartments (1 on the top deck, 2 on the middle deck, and 1 on the bottom deck) were outfitted with cameras, and the core body temperature (CBT) of 4 randomly chosen pigs (n=384) in each were recorded using orally administered iButtons. Trailer and deck loading order were randomized. Behaviors during transport, unloading and during lairage were recorded from video or live observations. Data were analyzed through ANOVA with ambient temperature external to the truck (AmbT) as a covariate. AmbT averaged 19.5°C±3.8°C (range: 14-26°C). At AmbT >23°C, there was no effect of sprinkling on behavior on-truck (standing, sitting or lying), but at AmbT <23°C, more pigs stood on sprinkled trucks (P<0.05). Sprinkling did not affect slips or falls during unloading. In lairage, latency to lie was shorter when AmbT exceeded 23°C (P<0.05) and sprinkled pigs spent more time lying and less time sitting (P<0.05) and had fewer drinking bouts (P<0.0001) regardless of AmbT. CBT increased between loading and departure and decreased while in transit for all pigs (P<0.0001), and sprinkling tended to reduce CBT at arrival at AmbT >24°C (P<0.10). Therefore, sprinkling pigs when ambient temperature exceeds 23°C may help to cool pigs and improve welfare, indicated by reduced number of drinking bouts and reduced body temperature at arrival. Adding water to the trailer did not have any detrimental effects during unloading.
Improving euthanasia on the farm: Testing the Zephyr-E for use as an alternative euthanasia technique for piglets from 3-9 kg

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As a litter-bearing species, it is not uncommon for pigs to have variability in size and vigour among littermates. To prevent unnecessary suffering of compromised and low-birth weight piglets, euthanasia is often the most humane option, but there are few methods available to the farmer. The objective of this study was to determine the effectiveness of the Zephyr-E for euthanasia of nursing and weaned piglets from 3-9kg (5-49 days of age). The Zephyr-E was used by 15 stock people to euthanize 150 compromised piglets by restraining piglets in a sling, placing the Zephyr-E on the frontal bone and firing twice in rapid succession. Piglets were monitored for signs of sensibility using brainstem and spinal reflexes. Duration of involuntary leg spasms and heartbeat were recorded to determine time of death. CT scans and macroscopic scoring were completed post mortem to quantify the degree of skull fracture and brain hemorrhage. The Zephyr-E caused immediate, sustained insensibility until death in 98.6% of piglets. Leg spasms ceased in <5 minutes in 97.3% of the piglets and cardiac arrest was achieved by 98% in <10 minutes. Stock person variation was significant for duration of leg spasms (p=0.044), but not duration of heartbeat (p=0.202). There were no significant differences among weight groups for either the duration of leg spasms (p=0.734) or duration of heartbeat (p=0.659). However, age significantly affected the duration of leg spasms (p=0.042) with younger piglets (≤21 days) having a shorter duration than older piglets (≥22 days). Average fracture displacement was 8.3 mm (±1.0SE). One piglet from the 9kg category had fractures present without displacement. Moderate to severe subdural-dorsal (SDD) hemorrhage was reported in ≥85% of piglets in each weight category. Moderate to severe subdural-ventral (SDV) hemorrhage was reported in ≥60% of piglets from weight categories 3, 5, & 7kg; whereas the SDV hemorrhage for the 9kg category was predominantly minimal to mild (56%). Not only does this technique provide a consistently humane end for the piglets by causing immediate insensibility until death, but it also improves the aesthetics of this challenging task and gives the stock person confidence that every euthanasia is carried out properly.
The effects of lidocaine and meloxicam on piglets during and post-castration

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Pain control needs to be considered with respect to routine piglet processing procedures, such as castration. Implementing pain control will be a challenge because it needs to be practical under farm conditions and it must take into consideration issues such as food safety. The aim of this study is to establish whether providing piglets with an anaesthetic and analgesic (lidocaine and meloxicam) will be an effective way to mitigate pain during and post castration by using a variety of pain related measures. Lidocaine will be given via an intratesticular injection, and meloxicam will be given via an intramuscular injection. A total of 400 male piglets will be used. Four piglets (4- to 8-days-old) from the same litter will be chosen and then randomly assigned to one of four castration treatments. Each treatment will consist of 2 injections, one per testicle (IT) and 1 injection in the neck muscle (IM). For the control treatment, a placebo injection of sterile saline will be used. To account for weight differences in piglets, the piglets in a litter will be ordered from largest to smallest and the treatments given will be rotated for each litter.

Castration will occur 3 to 5 minutes after the first injection of the lidocaine. A 3-point subjective score system of either 0, 1, or 2 will be given to assess the physical response of initial handling, IT injection, IM injection, the incision, and the pulling of the spermatic cord. A score of 0 represents no physical movement, whereas a score of 1 represents slight movement with intermittent gaps of stillness, and a score of 2 represents sustained struggling (>3s). The vocalizations of the piglets will be recorded during the procedure and will be analyzed as a measure of pain. Instantaneous scan sampling behaviour observations of treated piglets, when returned to their farrowing crates post-castration, will be carried out on a subset of the study population. The piglets will be weighed one or two days prior to castration and at weaning to see if pain relief affects growth rate. The results of this study will help to demonstrate whether the acute and post-surgical pain associated with castration is effectively controlled by a combination of local anesthetic (lidocaine) and a relatively long-acting analgesic, meloxicam.
Comparison of inter-observer agreement for different types of welfare measures using three animal welfare assessment protocols for swine

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Standard measures used in animal welfare assessments include animal-based measures (ABM) obtained by observing the animals (e.g. body condition scoring, or BCS), resource-based measures (RBM) obtained by observing facilities (e.g. non-slip flooring in walkways), and management-based measures (MBM) obtained by interviewing farmers and checking records (e.g. written/posted euthanasia plan). It is widely accepted that it is easy to train assessors to use RBMs and MBMs with good reliability, whereas ABMs are considered to be more direct measures of animal welfare, but more difficult to achieve good agreement among assessors. However, few measures have been systematically tested with respect to inter and intra-observer reliability. The objective of this study was to investigate inter-observer reliability of different types of measures used in three current pig welfare assessment programs. Assessors were graduate students in animal science programs with varying degrees of experience on pig farms. Nine assessors received 5 days in-class and 2 days practical training. Data was collected on 5 grow-finish farms over 8 weeks with assessors collecting data simultaneously each time. Preliminary descriptive statistics indicate that RBMs and MBMs generally have a lower standard deviation, and therefore higher reliability (agreement among observers), than most ABMs. When comparing two similar ABMs – BCS using two different scales – greater reliability was found with the ABM that was simpler. Perfect agreement (standard deviation=0) was found with a two-point BCS scale versus a greater standard deviation with a five-point BCS scale. Surprisingly, some measures that should have had a clear yes or no answer showed variability; for example RBMs regarding non-slip flooring and facilities’ state of repair did not obtain 100% agreement on 3 of 5 farms. It is possible that wording of questions or personal standards or experience of observers affected responses. Results of this study can be used to identify the best measures and revise training programs for on-farm animal welfare assessments.
Investigation of the Use of Meloxicam for Reducing Pain Associated with Castration and Tail-docking and Improving Performance in Piglets

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Castration and tail-docking of piglets are routine, painful procedures carried out in the swine industry. Despite evidence suggesting that both procedures cause distress to the animal, the use of anaesthesia and post-operative analgesia is not common. The lack of pain control associated with these procedures is of growing scientific and public concern due to consideration of piglet welfare. The objective of this study was to determine the safety and efficacy of meloxicam administered as a routine measure to piglets prior to castration and tail-docking in order to reduce post-operative pain and possibly improve performance. This study involved a total of 3,775 piglets from 407 litters. All piglets were randomly allocated to receive one of the following treatments at least 30 min prior to tail-docking and castration: an IM injection of meloxicam, an IM injection of a placebo or no injection. All piglets were weighed on the day of tail-docking and castration (5-7 d of age) and prior to weaning (19-21 d of age). The following measures were performed on subpopulations of pigs: vocalization scoring of male piglets during castration, behavioural observations following castration and tail-docking, and analysis of plasma cortisol levels. Castrated piglets receiving meloxicam displayed less isolated behaviour compared to piglets receiving the placebo ($P=0.02$), and had lowered plasma cortisol levels at 30 min ($P<0.01$), 60 min ($P<0.01$), and 90 min ($P<0.01$) following castration and tail-docking compared to those receiving the placebo, but cortisol levels at 4 h were not different ($P=0.45$). After tail-docking, the plasma cortisol levels of gilts receiving meloxicam did not differ from gilts receiving placebo. There were no significant treatment effects for weight gain, mortality or vocalization during castration. Producers in the future may need to consider using pain control as part of their standard operating procedures in order improve piglet welfare and meet their consumers' expectations, but are unlikely to see an economic return associated with using analgesia because growth performance is not affected. Meloxicam appears effective in the treatment of post-operative pain associated with surgical castration and tail-docking of male piglets based on plasma cortisol levels and behavioural observations.

1Metacam®, Boehringer-Ingelheim Ltd., Burlington, ON
Using a Y-maze test to assess whether broiler breeder hens prefer a quantitatively or qualitatively restrictive diet

Krysta L.H. Morrissey¹; Tina M. Widowski¹; Steve Leeson¹; Vicky Sandilands²; Hank Classen³; Stephanie Torrey¹,4

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² Avian Science Research Centre, Scottish Agricultural College, Auchincruive, Scotland
³ Department of Animal & Poultry Science, University of Saskatchewan, Saskatoon, SK, Canada
⁴ Agriculture and Agri-Food Canada, Guelph, ON, Canada

Because broiler chickens have the capacity to grow so quickly, the parent stock must be severely feed restricted to avoid obesity related health problems such as ascites, lameness, premature death and poor reproductive performance. This feed restriction can lead to stereotypic behaviour indicative of chronic hunger. Bulky high fibre diets reduce stereotypic behaviour, but it is unclear if broiler breeders find the bulking ingredients used in these diets aversive. This study investigated preferences of broiler breeders given the choice between quantitatively (control, C) or qualitatively restrictive (F) diets. The F diet consisted of the control diet diluted with 40% soybean hulls and 1-5% appetite suppressant (calcium propionate). Thirty-seven pullets were tested. To control for the effects of rearing diet, 17 were reared on the C diet and 20 were reared with F. Birds were trained to associate each diet with a feeder colour (blue or red) and location (left or right). All diet/colour/location combinations were tested. Following 4 days of training, each pullet was tested over 4 days using a Y-maze. Data were analyzed using a mixed model (SAS 9.2). Overall, no dietary preference was revealed, indicating that broiler breeders do not find fibre dilution to be aversive. However, this does not support our hypothesis that opportunities to eat more would be preferred. Even though all birds experienced both colours equally, there was an effect of rearing diet on colour choice (P = 0.039), as F-raised birds chose the red feeder more often. However, on an individual basis, 17 pullets chose the same feeder for all 4 of their test days. Seven others were consistent for the last 3 test days. This suggests that some birds have preferences, but are quite individual. Alternatively, the training regime may not have been sufficient to cause an association between the feed and its satiating properties.
On the significance of puzzling behaviours: what do yawning and adult play tell us about horse welfare?

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Some behaviours remain a mystery as their determinants are still uncertain. Here we propose new hypotheses to explain two puzzling behaviours in horses, i.e. yawning and adult play, recorded in large samples of domestic animals kept in sub-optimal conditions (e.g. time-restricted feeding practices, social isolation) and displaying evidences of poor welfare states (e.g. stereotypic behaviours). Yawning is involved in behavioural state changes, especially in quiet contexts of motor relaxation, but might also be triggered by stress and emotional contexts. Here we investigated specific correlates of yawning and stereotypic behaviours in two samples of working horses (n₁ = 87 geldings, n₂ = 44 geldings, 15 mares; 5-20 year-old, 82% French Saddlebred). Results show clear co-occurrences of yawning and stereotypic behaviours: stereotypic horses yawned more than the non-stereotypic horses (Fisher, p<0.02), yawning increased at the same time periods as stereotypic behaviours did (Wilcoxon, p<0.05 to 0.001) and yawning frequency was even sometimes positively correlated with stereotypic behaviour frequencies (Spearman correlations, p<0.005). Play, more typical of young stages of life in healthy individuals, occurs rarely at adult stages in natural conditions, and we tested the hypothesis that adult play might reflect altered welfare states in adult working horses kept in sub-optimal conditions. We observed the behaviour - in particular social play - of 29 adult horses from the same stable (23 geldings, 6 mares, 7-17 year-old, 80% French Saddlebred) during occasional outings in a paddock and measured several stress indicators (health-related, behavioural and physiological) when these horses were in their home individual boxes. Results revealed that the number of “playful" horses and rates of adult play seemed to be high compared to field report data, and that most “playful" animals were more prone to suffer from chronic stress in comparison to “non-playful" horses (e.g. more ‘withdrawn' from environmental stimuli, more vertebral disorders, more aggressiveness towards humans, Fisher, Chi-square, Mann-Whitney, Spearman correlation, p<0.05 to 0.001). Altogether, these results show that yawning and adult play can both reflect altered welfare states in horses, highlighting that these puzzling behaviours do not only reflect, as often thought, good welfare states and/or expression of positive emotions in animals.
Exploring Donkey Welfare & Positionality in Maun, Botswana

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Donkeys in Botswana play an important role in society. They provide people with transport, agricultural labour, and food yet they suffer from low status and receive little attention from the Botswana government, veterinarians, researchers, and citizens. Not only is donkey welfare compromised, in terms of their physical and emotional well-being, so too is the ability of donkeys in turn to enhance human livelihoods through their various roles. The proposed research explores the relationship between donkey welfare and positionality in Batswana society. Through a mixed social science methodology, this research will (i) document the ways in which humans use, care for and value donkeys, (ii) measure physical and emotional aspects of donkey welfare, and (iii) assess donkey welfare as a function of human positioning of donkeys in society. These results will provide baseline data on the extent and nature of welfare issues associated with donkeys in Botswana, and will generate insights on how human circumstances, perceptions, and actions shape the health and well-being of their donkeys. The proposed research will contribute scholarly insights to human-animal studies and animal welfare science, and will inform government livestock programming and local animal welfare organizations in Botswana.
The nature of social play and its relation to sexual behaviour in farmed mink

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Play is pervasive in juvenile mammals, but its benefits are unclear. We investigated social play in American mink, Neovison vison, to characterize basic attributes of this little-studied behaviour and test hypotheses about its long-term effects on welfare and fitness. We predicted that frequent juvenile social play would, in adulthood, correlate with low fearfulness and high male sexual competence. We observed 93 non-enriched sister-brother pairs of farmed juvenile black mink, and their 93 enriched sibling pairs, given golf/wiffle balls and a hanging length of hose. Social play and solitary object play appear to have different motivational bases: in enriched mink, being able to play with objects did not reduce social play compared to their non-enriched siblings (paired t-test: t=0.67, p=0.506), and time spent performing both types of play was uncorrelated (r=0.064, p=0.540). Individual differences were stable: social play at 10-11 and 16-20 weeks co-varied (F1,90=11.55, p=0.001). Social play may be somewhat heritable: it tended to positively correlate between non-enriched and enriched siblings (r=0.196, p=0.066), but this was likely an artifact of the strong heritability of general activity (r=0.510, p<0.001). Social play did not appear to dampen fearfulness in adulthood ~3 months later: it was unrelated to likelihoods of retreating from a stick inserted into the cage (logistic regression: odds ratio for 1SD difference=1.08, p=0.665). Social play may, however, prepare males for adult sexual behaviour: it tended to positively correlate with the number of copulations obtained (N=60, rho=0.204, p=0.064; non-enriched only: rho=0.323, p=0.050), and was strongly positively correlated to copulation duration (F1,45=8.20, p=0.006). Among non-enriched males, social play tended to correlate with shorter latency to initiate copulation (rho=-0.285, p=0.073). Independently, enrichment had similar effects on copulation (see Kaela Shaw’s poster). Our study thus suggests a link between social play and male sexual behaviour: we now plan to experimentally manipulate opportunities for juvenile social play to verify whether it has a causal role and to investigate how its relationship to sexual behaviour is mediated. In contrast, we found no relationship between social play and adult fearfulness; we now plan to use more sensitive, quantitative behavioural and physiological measures to re-test these potential effects.
Improving Enrichment Practices for Laboratory Mice

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For laboratory rodents, the benefits of environmental enrichment are very well known. However, cost and other considerations mean that enrichments are not universally used. There are few standard practices regarding the provision of environmental enrichment at mouse breeding facilities, and often, no enrichments are provided at all. Similarly research labs purchasing mice from such companies vary hugely in the degree and type of enrichment they provide. Our aims are to investigate the pros and cons of discontinuous enrichment, in order to model and understand the implications of provision of enrichment by a breeding company but not thereafter, or instead its provision only after purchase by the end user. This proposal is inspired by evidence on the key role of early experience. Early enrichment is especially important for normalizing brain development. This would suggest that early enrichment at the breeding company could have lasting benefits, and indeed some studies show that early enrichment protects mice from developing stereotypic behaviours in non-enriched cages in adulthood. On the other hand, removing resources that an animal has become accustomed to may lead to welfare problems such as depression-like states. Our specific aims for this project are therefore two-fold. First, we will investigate whether providing enrichments to nursing dams (two strains; C57BL/6 & DBA/2), and to their pups until 8 weeks of age (the young adult age by which most mice are sold), would be beneficial to their future welfare if then moved to barren cages, or whether instead it would be actively counter-productive. Second, we will investigate whether the enrichment at 8 weeks of a mouse born and raised in non-enriched conditions (as if from a breeder that provides barren environments up until sale) can fully ‘rescue’ these animals, improving their welfare and behavioural normalcy to the levels of those enriched-housed since conception; or whether instead their early experiences cause lasting impairments that cannot be fully reversed by well-meaning end users purchasing young adults. Ultimately, this research will help to inform best enrichment practices for mouse breeding companies and laboratories using mice for research.
Assessment of beef cattle temperament on farms

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While years of domestication have made beef cattle reasonably tractable to handle, it has been discovered that the lingering variation in their temperament accounts for some differences in individual performance. Literature suggests cattle that have a more reactive temperament have negative production attributes (e.g. decreased average daily gain), produce meat with decreased quality characteristics (e.g. less tender), reduce welfare and threaten handler safety. The industry is interested in exploring practical ways to measure temperament, and whether this might be useful for consideration in breeding selection. The main objective of this project is to test three different practical methods for assessing beef cattle temperament on farms by comparing how they rank each animal in temperament scoring. The temperament scoring for each animal will be related to productivity parameters and meat quality characteristics to further investigate the link between behaviour and production. Data will be collected on a maximum of 12,500 bulls, steers and heifers on commercial beef farms in Ontario, which volunteer for a primary study being led by Beef Improvement Opportunities. Backfat ultrasound images will be collected to provide live carcass body composition data, and post-slaughter meat quality results will be examined. Temperament will be assessed via subjective chute temperament scoring, chute exit velocity and percentage of exposed eye that is white; all of which are techniques currently being researched. Additional data will be collected to potentially explain variation in temperament including; willingness to enter and leave the chute, vocalizations and duration of time restrained. It is hypothesized that cattle that have a reactive temperament at handling (e.g. more agitated in chute, exit chute more quickly) will have less desirable production attributes (e.g. reduced tenderness scores) and undesirable meat quality characteristics (e.g. dark cutting). The results of this study will provide further evidence of the link between temperament and production attributes, meat quality and animal welfare, contributing to the overall goal of improving the profitability and efficiency of beef production systems.
Identifying subtypes of inactivity that indicate poor welfare in captive mink

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Inactivity is sometimes used to infer positive states (e.g. relaxation; comfort), yet certain forms may indicate negative states (e.g. fear; pain; apathy). To identify sub-types of inactivity that might reflect good versus poor welfare in mink, we used the provision and removal of super-enriched versus non-enriched housing to manipulate welfare; previous studies had shown that super-enriched cages are preferred and stress-reducing, and our data confirmed that they reduce FCM (P=0.040), and, in females, stereotypies (sex*housing: P=0.004). We also assessed faecal cortisol metabolites (FCM) and fear in “glove tests”. We hypothesized that sub-types of inactivity reflecting poor welfare would increase with the absence or removal of enrichment, and, if related to anxiety or frustration, co-vary with FCM and fearfulness. Mink were first housed long-term in large cages enriched with ‘toys’ plus wading water (Experiment 1: N=32; Experiment 2: N=13) or non-enriched cages (Experiment 1: N=32; 2: N=16), before being subjected to housing swaps (Experiment 2). Inactivity was recorded, plus three variables to distinguish sub-types: location (in nest-box/out in cage); arousal (alert/eyes closed); and posture (curled/belly-down/belly exposed).

Inactivity in the nest-box was higher in non-enriched housing among females in Experiment 1 (housing*sex P<0.001) and increased by enrichment-removal (P=0.018) in Experiment 2, although not decreased by enrichment-gain (P>0.10). It also correlated with fear and stress: fearful males spent the most time in the nest-box (sex*temperament P=0.054), while females’ decreases in FCM when they gained enrichment correlated with decreased inactivity in the nest-box (sex*FCM change P=0.019). Lying alert was also consistently elevated by non-enriched housing (Experiment 1: P=0.013) and enrichment-removal (P=0.021), while decreased by enrichment-gain (P=0.004). Lying belly-down was also sometimes decreased by enrichment (Experiment 1: P=0.001; Experiment 2 after housing-swap: P=0.054). However, neither of these sub-types co-varied with fearfulness or FCM (P>0.10). Lying curled, by contrast, was increased by enrichment (Experiment 1: P=0.001; Experiment 2 after enrichment-gain: P=0.079). Overall, lying curled may therefore be an indicator of positive welfare, while inactivity in the nest-box and lying alert both emerged as potential indicators of poor welfare. Future research will now seek to replicate these findings and investigate the states underlying these forms of inactivity.
Location! Location! Location!  The effect of cage size and density on the use of nest boxes in large furnished cages

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Furnished cages for laying hens are an alternative to the much smaller and more barren conventional cages from the standpoint of both production and welfare; the most important feature provided is the nesting area.  Previous research into egg-laying patterns in furnished cages attributes laying outside the nest box to either early experience, an absence of suitable nest site features or lack of individual nest preference.  Proposed state-level regulations in the USA include an interim period where space allowances in furnished cages will gradually increase.  Currently, there is little information regarding the amount of nest space required for large group sizes (for flocks greater than 5 but less than 100) housed in furnished cages.  Our objective was to determine the effect of cage size and density on the use of the nesting area in furnished cages.

Groups of hens were housed in two different cage sizes (20880cm²; 41296cm²), each at two different stocking densities (520cm², 750cm²/bird) resulting in group sizes of 28, 40, 55 and 80 birds.  Curtained nesting areas with plastic mesh floors were 70cm² and 100cm²/bird in the high and low-density cages, respectively.  In each cage, the scratch area consisted of a smooth plastic mat adjacent to a solid wall opposite the nest area.  Each combination of cage size and density was replicated 6 times for a total of 1218 birds in 24 cages.  The location of each egg laid (nest, floor, scratch) was recorded for each cage, for weeks 20-39.  The percentage of nest eggs was lower (p=0.0445; SAS GLM fixed model) in large cages (89.0%±0.79) than in small (91.4%±0.79), but there was no effect of density (p=0.59) or interactions between cage size and density (p=0.31).  More eggs were laid on the scratch area in large cages (10.3%±0.76) than small (7.6%±0.76; p=0.025).  This suggests that other features of the cage design or group size rather than designated nest space (which differed only between densities) influenced nesting location.
Assessing foraging and dustbathing behaviours of laying hens in two cage sizes and densities in furnished cages

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Public concern for animal welfare and recently introduced legislative changes have encouraged changes in the housing systems for laying hens. Furnished cages, which provide increased space per bird, perches, nest site and scratching materials, are an alternative to conventional cages. Cage designs vary considerably and can include a litter dust bath or section of turf on which litter or feed is applied as substrate. Because litter in cages is difficult to manage and turf mats often become soiled, some models of cages are furnished with smooth plastic mats. The proposed pecking and scratching areas in furnished cages are an attempt to accommodate both foraging and dustbathing behaviour, but cage design, size and density may not actually support these behaviour patterns. The goal of this study is to investigate foraging and dustbathing behaviours in cages furnished with a smooth plastic mat on which feed is regularly distributed as a substrate by auger. To do this, the amount and location of foraging and dustbathing behaviours will be determined in furnished cages of different sizes and densities. The experimental design will include two cage sizes (23,300 cm² = small cages, and 47,500 cm² = large cages) and two densities (830 cm²/hen = low density, and 580 cm²/hen = high density) resulting in group sizes of 28, 40, 55 and 80, with six replicates per treatment. Each cage has a single mat with an area of 2,600 cm². Using scan sampling live observations over eight days, the number of birds performing each of these two activities and their locations within the cage will be recorded. Locations include the nest, perch area, scratching mat, and sections of wire floor divided between nest and feeder area, between perch and feeder area, and between scratching mat and feeder area. Observations will be done four times a day between 8:30 am and 4:30 pm, including before and after feeder replenishing and scratching mat's auger activation. Although furnished cages are a good attempt to enhance animal welfare in laying hens, current designs need to be evaluated to promote performance of behaviour patterns considered to be important for hens’ welfare.
Plucking behaviour in companion parrots: Do species differ in their intrinsic susceptibilities, and if so, why?

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Millions of parrots (Psittaciformes) from 200+ species are kept in zoos, breeding centres, and private homes. These diverse species are widely assumed – but not empirically demonstrated – to differ in their intrinsic susceptibilities to certain health and behaviour problems. My project will use the “comparative method” to examine why this occurs. In this preliminary study, we aimed to determine whether species identity or other supposed risk factors predict the incidence of a known indicator of poor welfare, feather plucking (or “feather-damaging behaviour” [FDB]). We analyzed pre-existing data from a survey of pet owners who recorded FDB status (presence/absence) and other measures for individual birds (658 companion parrots representing 23 non-domesticated, non-hybrid species; n≥8/species). FDB prevalence was 14.7% overall and varied between species (G22=55.95;P<0.0001). We used logistic regressions to test whether suggested risk factors (species, sex, age, hatch origin) or aspects of husbandry (e.g., diet composition) predicted individual FDB status across the 23 species. Species identity was the main predictor in these models (χ2≥35.97;P≤0.031), even after controlling for the other variables. Further analysis of the best-sampled species (n≥17/species; enabling calculation of relative odds ratios) confirmed previous, informal suggestions about species more or less susceptible to FDB. Other significant predictors of FDB status were sex (male/female/unknown: χ2≥9.75;P≤0.008) and age (juvenile/adolescent/adult: χ2≥14.86;P≤0.001). These findings provide empirical support for the hypothesis that intrinsic species differences in FDB risk exist among captive parrots; however, they will need to be replicated using a larger, more detailed data set that allows full statistical control for systematic differences in housing. Assuming that closely-related species are confirmed to differ in their native susceptibilities to welfare problems, I will test the hypothesis that certain natural biological traits are risk factors that predispose species to FDB or other welfare-related problems (mortality, breeding troubles) in environments that constrain those traits. To illustrate, if sociality is a risk factor, then welfare should be poorest in the most naturally social species (i.e., those whose natural social structures are most restricted in captivity). Once determined, welfare risk factors could be used to predict which species will fare best in different captive environments or to identify means of improving parrot husbandry.
Male mink raised with simple environmental enrichments show improved copulation performance in adulthood

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Males in captive breeding programs (e.g. giant pandas and black-footed ferrets) often have low reproductive success; and on mink farms, over 10% of males fail to mate adequately. This may be due to sub-optimal environments: data from super-enriched American mink, *Neovison vison*, show that very large, well-appointed cages reduce males’ physiological stress, increase testosterone levels, and enhance their mating rates by decreasing stereotypy performance and improving physical development. We therefore investigated if simple enrichments – golf balls, wiffle balls and hanging lengths of garden hose – would improve mating success in male mink in farm conditions. 400 male-female sibling pairs (from 200 litters) were chosen at c. 3 months of age (juvenile, post-weaning); one sibling pair from each litter was reared in standard housing, the other reared with enrichments. Seven months later, 54 of these males (25 non-enriched and 29 enriched, including 9 pairs of differentially-raised brothers) were used as breeders. Prior to mating, faecal and urinary samples were collected for steroid assay. For mating, males were moved to identical non-enriched cages, and given access to 1-3 females daily for up to 17 days (based on performance). Two observers blind to male treatment collected data on the first mating of each day. Rates of mating failure did not seem to differ between groups, but amongst successful matings, enriched-raised males copulated for longer (Mann-Whitney z=2.13, p=0.033): potentially important because mating stimulates ovulation in mink, with short matings leading to smaller litters. In analyses of the brother pairs, enriched subjects were also quicker (by c. 3.5 minutes on average) to “catch” females (paired t test= 2.38, p= 0.04). “Catching” is the initial phase of mating, involving the male biting the female’s scruff and lying with her as she becomes quiet and receptive. Overall, these results indicate that even simple environmental enrichments can improve male reproductive performance in adulthood by decreasing latencies to initiate mating behaviours and increasing copulation duration. Future analyses of data from these males will investigate hormonal differences via faecal steroid metabolites, while future work will investigate whether enriched males produce larger litters.
Investigation of the Use of Meloxicam Post-Farrowing for Improving Sow Performance and Reducing Pain

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Crushing of piglets by sows is a major source of economic loss and reduced welfare, with most deaths occurring within the piglets' first 24 h of life. Piglets must quickly gain access to a teat and consume colostrum soon after birth in order to obtain sufficient energy supplies and protection from disease. Therefore, it is important that a sow settles quickly after farrowing and readily begins to nurse her litter. Administering analgesics to sows at farrowing may alleviate pain and allow them to lie more restfully, and thus provide piglets more opportunity for colostrum intake without the risk of being crushed. The objective of this trial was to determine the efficacy of meloxicam\(^1\) administered to sows at the time of parturition with regard to nursing behaviour and piglet survival and growth. A total of 3,006 piglets from 289 litters were used. Sows were randomly allocated to receive one of the following treatments within 12 h of farrowing: an IM injection of meloxicam or an IM injection of a placebo. All piglets were weighed within 12 h of birth, at castration and tail-docking (5-7 d of age), and prior to weaning (19-21 d of age). The following measures were performed on subpopulations of sows: position changes (41 sows), rectal temperatures and feed intake scores (34 sows), and analysis of plasma cortisol levels (20 sows). There was a tendency for sows receiving meloxicam after farrowing to have lower plasma cortisol levels than sows receiving the placebo at 4 h following treatment \((P=0.09)\). There were no significant treatment effects for piglet weight gain and mortality or sow position changes, rectal temperatures, and feed intake scores. Meloxicam may be effective in the treatment of post-farrowing pain based on plasma cortisol levels, but a larger sample size is needed to evaluate this further. Although meloxicam did not improve piglet growth or survival, its administration of to sows after farrowing appeared to be safe based on these measures. The use of analgesics to alleviate pain immediately after farrowing may be a useful tool for a subset of animals (possibly those with prolonged or difficult parturitions), and this area will require further study.

\(^1\)Metacam\(^\circledast\), Boehringer-Ingelheim Ltd., Burlington, ON
Effect of Two Different Analgesics Given Prior to Castration to Relieve Post-Surgical Pain in Piglets

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In Canada, all male piglets are routinely castrated and there is evidence that the procedure causes pain. Surgical castration involves several events likely to be painful including scrotal incision, extraction of the testes, and severing the spermatic cords. There are few products licensed for use in food-producing animals for pain control, and few studies have been done to compare their relative effectiveness. The objective of this paper is to evaluate the efficacy of two non-steroidal anti-inflammatory drugs (NSAIDs), meloxicam\(^1\) and ketoprofen\(^2\), for the treatment of post-operative pain associated with surgical castration of male piglets. Two different studies were carried out on the same swine operation and involved a combined total of 2,990 piglets from 997 litters (meloxicam: 1,499 piglets from 407 litters; ketoprofen: 1,491 piglets from 590 litters). In both studies, piglets were randomly allocated to receive an IM injection of either the analgesic (meloxicam: 0.4mg/kg; ketoprofen: 3mg/kg) or a placebo at least 30 min prior to castration. All piglets were weighed on the day of castration (5-7 d of age) and prior to weaning (meloxicam: 19-21 d of age; ketoprofen: 19-23 d of age). Castrated piglets receiving meloxicam had lowered plasma cortisol levels at 30 min \((P<0.01)\), 60 min \((P<0.01)\), and 90 min \((P<0.01)\) following castration compared to those receiving the placebo, but cortisol levels at 4 h were not different \((P=0.45)\). The same was true for piglets receiving ketoprofen at 30 min \((P<0.01)\), 60 min \((P<0.01)\), 90 min \((P<0.01)\), and 4 h \((P=0.09)\). Plasma cortisol levels of piglets receiving the placebo before castration did not differ between the meloxicam and ketoprofen studies at 30 min \((P=0.73)\), 60 min \((P=0.11)\), 90 min \((P=0.57)\), or 4 h \((P=0.32)\). There were no significant treatment effects for weight gain or mortality in either study. Despite pressure for animal welfare advancement, the use of analgesia or anaesthesia in farm animals during routine painful procedures is still not a routine practice. Future consumer expectations may require producers to consider using pain control as part of their standard operating procedures. The NSAIDs meloxicam and ketoprofen appear effective in the treatment of post-operative pain associated with surgical castration of male piglets based on plasma cortisol levels.

\(^1\)Metacam®\(^\text{®}\), Boehringer-Ingelheim Ltd., Burlington, ON

\(^2\)Anafen®\(^\text{®}\), Merial Canada Inc., Baie D’Urfé, QC
Do I look scared? Exploring the use of anxiolytic drugs on fear responses of domestic laying hens

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Evidence for emotional states may be investigated using pharmacological agents known to affect the central mechanisms controlling fear or anxiety and determining effects on behaviour. The objective of this study was to test anxiolytic drugs on the fear responses of hens. Twenty four laying hens were given a single dose of Imipramine (tricyclic antidepressant), R121919 (CRF-1 receptor antagonist) or saline intramuscularly prior to testing them under a novel object (NO) or tonic immobility (TI) paradigm. The NO test assumes that less fearful hens will approach the object whereas more fearful hens will avoid it. The TI test assumes that longer durations of immobility reflect higher levels of fearfulness. We hypothesized that hens receiving these drugs would show decreased fearful responses and lower levels of plasma corticosterone in response to the frightening stimuli. However imipramine increased corticosterone levels after both tests (TI: F(2,22)=19.02, p<0.0001; NO: F(2,22)=18.76, p<0.0001) and neither drug affected TI duration (F(2,23)=1.17, p>0.05). All groups increased their avoidance distance upon NO presentation, but imipramine birds had an overall avoidance distance that was higher than R121919 and saline groups (F(2,22)=6.67, p<0.01). This was likely due to the higher overall activity level (number of steps) shown by imipramine-treated birds both before and after presentation of the NO (F(2,22)=8.37, p<0.05). Neither drug group showed a difference between number of vocalizations emitted before and after NO presentation (imipramine: t(6)= -0.65, p>0.05; R121919: t(7)= -2.06, p>0.05), whereas control birds vocalized more after NO presentation (t(7)= -3.40, p<0.01). Counter to our hypothesis, neither drug consistently attenuated fear responses. Though early research on this topic has shown some drugs can attenuate fearful TI responses, the data have not always been congruous. In addition, most studies have used chicks, for whom pharmacokinetic properties likely differ from that of mature hens. Effects of anxiolytic drugs on the birds’ emotional state remain unclear. While there were some clear behavioural effects, these were not always in the direction that would imply reduced fear based on the assumptions of these tests.