

ABSTRACTS

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What Should Animal Science Departments be Doing to Address Contemporary Issues?

1 Panel evaluation and prediction of odor from chemical measures of dairy manure. W. J. Powers*, H. H. Van Horn, A. C. Wilkie, and R. A. Nordstedt, *University of Florida, Gainesville.*

Treated dairy manure was evaluated for odor intensity using a triangular forced-choice panel method. Commercial odor products (5), representing plant extracts, fermentation stimulants, and likely a masking agent plus KMnO_4 and H_2O_2 were added to anaerobic digester effluents, digester feedstock, and fresh manure then stored in stoppered flasks for 1, 2, or 3 d before odor evaluation and determination of concentrations of individual VFA, total phenol, and $\text{NH}_3\text{-N}$. One odor product proposed to be a beneficial feed additive was fed to lactating Holstein cows and compared with no additive. Diluted urine, feces, and manure (urine + feces) collected from individual cows were evaluated simultaneously with digester effluents and feedstocks. Feeding the additive had no effect on milk production, manure odor or analytes. However, manure was found to have a higher odor intensity than either urine or feces and fresh manure was less odorous than untreated digester feedstock which represented manure which had been stored 3 d, frozen and thawed before diluting to 2.0% or 1.3% total solids. Odor of fresh manure peaked by 2 d holding. The commercial products tested did not significantly change odor intensity but some did reduce $\text{NH}_3\text{-N}$ concentration. Anaerobic digestion reduced odor intensity scores up to 50% with 20 d retention time. Total phenol was the analyte most highly correlated with odor intensity ($r = .62$) and the most influential component of an odor prediction equation ($R^2 = .64$) including all analytes measured. These data indicate 1) that management practices which entail short-term storage of manure exacerbate odor intensity likely due to the accumulation of odorous intermediates, 2) most manure additives are unlikely to reduce odor appreciably whereas anaerobic digestion can have major benefit, and 3) odor prediction from most frequently measured volatiles is not yet accurate enough to replace human panels.

Key Words: Odor, Additives, Anaerobic Digestion

2 Use of competing conceptions of risk in animal agriculture. H. O. Kunkel*, P. B. Thompson, B. A. Miller, and C. L. Skaggs, *Texas A&M University, College Station.*

Coping with risk and uncertainty has become a growing necessity for animal agriculture. But, issues such as are related to E. coli contaminations of food, the waste stream, essentiality of animal products in the human diet, and bovine spongiform encephalopathy (BSE) incorporate different conceptions of the risks involved and require different approaches to handling the uncertainty involved. Thompson and Dean (Risk: Health, Safety & Environment 7:361-384, 1996) have suggested a dichotomous schema designed to assist understanding risk, which may be adapted to recognizing and handling risk. The polar aspects of the proposal are the probabilistic approach at one end and the contextual understanding at the other. Probabilist conceptions of risk presume that risk is determined by probability and consequence. Contextual conceptions will presume that management, law, regulation, media and public perceptions, as well as the severity of the consequence, will figure prominently in decision making in the face of uncertainty. Relative emphasis upon probabilistic characteristics shapes distinct understandings of risk that can be plotted between the poles. We are proposing that these conceptualizations need not be issues only for debate but also for recognition of the probabilistic or contextual nature of the risk. Specific actions and also policy may be constructed on the basis of the conceptualization. The BSE case is examined philosophically and methodologically as a contextual challenge to animal agriculture and associated industries.

Key Words: Agriculture, Conceptions of risk, Uncertainty in animal agriculture

3 Survey of stunning and handling practices in Federally inspected slaughter plants. T. Grandin, *Colorado State University, Fort Collins.*

Stunning and handling was assessed from an animal welfare standpoint in Federally inspected plants in 10 states. Seven plants (64%) out of 11 placed the electric stunner correctly on 99% or more of the animals. Two plants had serious problems because 10 to 35% of the animals were stunned on the neck. In 11 plants which used captive bolt-stunning, only 4 plants (36%) rendered 95% to 100% of the cattle insensible with one shot. In the other plants one shot scores ranged from 91% to 80%. A high percentage of missed first shots was due to poor gun maintenance and poor ergonomics of pneumatic stun guns. Handling of animals was better in the holding yards compared to the stunning area. Animals slipping and falling in the stunning area was a serious problem in 4(36%) of the beef plants. The percentage of cattle prodded with an electric prod ranged from 5% in one large excellent plant to 90% in the worst plant. Electric prodding of pigs ranged from 15% to almost 100% of the animals. In four beef and pork plants that had excessive electric prodding, prodding was reduced from a mean of 63% of the animals to 16% by training employees. The slaughter line was kept full when prodding was reduced. In 8 beef plants vocalizations in the stunning chute area ranged from 0 to 2.6% of the cattle in the four best plants and 6.6% to 35% in plants rated not acceptable or a serious problem. Vocalization scores were significantly reduced in the two roughest beef plants from an average of 22% to 7% after excessive prodding was stopped. ($P < .001$). The percentage of animals that vocalized due to discomfort in a restraint device ranged from 0% to 14% of the pigs (7 plants) and 0% to 7.5% of the cattle and calves (8 plants). Vocalizations induced by electric prods were subtracted.

Key Words: Slaughter, Stunning, Welfare, Vocalization

4 Do domestic animals possess minds and intelligence? S. Davis*, P. Cheeke, and R. Christian, *Oregon State University, Corvallis.*

We conducted a survey of faculty in the Department of Animal Sciences (no. of respondents = 13) and the Department of Zoology (n = 8) at Oregon State University to test the hypothesis that these scientists believe that animals do have minds and intelligence. We intentionally did not define the terms "minds" and "intelligence" because we were interested in the scientists' perceptions of these traits. To the question, do animals have minds, animal scientists responded 66% yes, 17% no and 17% neither (because we hadn't defined the term). In comparison, only 37% of the Zoology faculty said yes, while 25% said no and 37% gave no answer, again because they were concerned about the absence of a definition. To the question, are there species differences in intelligence, animal scientists responded 88% yes, 6% no, and 6% neither, while zoologists responded 88% yes, 0% no, and 12% neither. The ranking of relative intelligence (1 = highest, 5 = lowest) was as follows:

Mean rank ± SEM			
Animal Scientists		Zoologists	
Dog	2.25 ± .43	Dog	1.53 ± 0.87
Pig	2.60 ± .39	Cat	1.67 ± 0.62
Horse	2.80 ± .33	Pig	2.00 ± 0.62
Cat	2.81 ± .33	Horse	2.40 ± 0.58
Cow	3.40 ± .24	Cow	2.83 ± 0.41
Sheep	3.42 ± .29	Sheep	3.00 ± 0.45
Chicken	3.67 ± .40	Chicken	4.50 ± 0.41
Turkey	4.00 ± .39	Turkey	4.83 ± 0.29

These results suggest that (1) our hypothesis was correct for animal science faculty in which the majority said that animals have minds, (2) there was an apparent difference between departments on this issue because substantially fewer zoology faculty answered yes to this question, (3) faculty in both departments perceive that there is a difference in intelligence among species, and (4) the perceptions of the rank in intelligence were almost identical between the two departments.

Key Words: Animal Minds, Intelligence, Domestic Animals

5 Certification in the meat channel. F. Mortiaux*, R. Renaville, N. Gengler, I. Parmentier, S. Massart, C. Bertozzi, B. Burny, and D. Portetelle, *Faculty of Agronomy, Gembloux, Belgium.*

In the confused context of the use of anabolic substances (natural or synthetic), consumers ask for certified 'hormone-treated free' products. Methods used to identify unequivocally individuals in bovidae have so long been based on blood groups characterization. Problems can be encountered in small or inbred populations, as those systems appear to be insufficiently polymorphic. A more precise method can be used that directly highlights polymorphisms at the DNA level, at very polymorphic loci called microsatellites, with codominant alleles, segregating in a mendelian way, constituted by a variable number of a tandemly repeated motif of 1 to 6 base pairs, more commonly (CA)_n/(TG)_n, resolvable by electrophoresis of PCR products and fluorescence detection in a sequencing gel. The aim of this study was to develop fingerprint method to certificate animals, carcasses or foodstuffs in the meat channel. The 11 loci of the StockMarks kit (Perkin Elmer), located on distinct chromosomes were analyzed in 4 Belgian breeds: Belgian White-Blue (n=50), which is a moderate inbred race, White-Red (n=49), Red-White (n=50), two small populations, and Black-White (n=49) cattle. Ease of interpretation, allelic frequencies and informativeness have been evaluated and calculated for each marker. Probabilities for two random genomes to be identical are better than 10⁻⁹ for the 11 markers simultaneously in the 4 breeds. This rapid method can be performed with DNA from varied tissues as semen, blood, muscle, hair roots, saliva, even cooked or processed products, which is particularly interesting to identify animals during the life and even beyond. Such a mean of analysis is powerful to detect misidentifications in the meat channel or as a tool for the certification of animals, carcasses or foodstuffs. (Grant n°5687A, Ministère de l'Agriculture / Fonds de la Santé et de la Production des Animaux)

Key Words: Bovine, Fingerprint, Certification

6 Variation in milk composition and somatic cell count of Holstein-friesian cows of different parity. S. Bedő and Z. Szakács*, *University of Gödöllő.*

The investigations were carried out using 1st, 2nd and 3rd-lactation cows (n=75). Daily milk yield, fat, protein and lactose content and somatic cell count were measured monthly during 10 months of the lactation. Fat and protein yield increased with parity and with increasing milk yield. Negative correlations were found between daily milk yield and fat% on one hand, and between daily milk yield and protein% on the other hand ($r = -0.46$ – -0.47 and $r = -0.33$ – -0.50 , respectively). The correlations were closest for the 3rd lactation. Positive correlation, increasing with parity was detected between fat% and protein% ($r = 0.38$ – 0.55). Somatic cell counts were lowest during the 1st lactation. High cell counts were detected during the 1st month of the lactation which later gradually decreased. More elevated cell counts were found again in the 6th month which were decreasing again. No or week correlations could be detected between somatic cell count and daily milk yield and percentages of milk components. According to these results somatic cell count levels of 450 000-665 000/ml seem to have no impact on milk composition.

Key Words: Somatic cell, Protein%, Fat%