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SYMPOSIA AND ORAL SESSIONS

Bioethics: Teaching Animal Ethics Within Today's Animal Science Curriculum

245 Teaching bioethics in the animal sciences: Challenges and strategies. C. C. Croney*[1] and D. J. R. Cherney[2], [1]*Oregon State University*, *Corvallis*, [2]*Cornell University*, *Ithaca, NY*.

As critics and the consuming public increasingly scrutinize the efforts of Animal Scientists, the need to incorporate ethics education into the traditional Animal Sciences curriculum is growing. Efforts to meet this goal have been both promising and problematic. Many animal scientists, engaged in debate about ethical animal use and treatment often respond inappropriately—with off-hand self-justification, rationalizing and dogmatism. Such responses may be a reflection of the limitations of Animal Sciences students and faculty in regards to their academic training and expertise in animal bioethics. Most of our faculty lack formal education in moral philosophy, so it can be difficult to avoid adopting and teaching an overly simplistic problem-solving approach to complex ethical questions. Some faculty are now adapting pedadogical tools used by social scientists to develop useful in-house strategies to overcome the challenges of teaching bioethics in Animal Sciences. Role-playing, moral reasoning and analyses of carefully constructed case studies are only a few of the tools that can be implemented to facilitate these efforts.

Key Words: Bioethics, Teaching, Curriculum development

246 Incorporating ethics into the undergraduate curriculum. D. J. R. Cherney*[1] and C. C. Croney[2], [1]*Cornell University*, *Ithaca, NY*, [2]*Oregon State University*, *Corvalis*.

Ethical issues such as animal welfare, rural community issues, environmental concerns, and genetic engineering have garnered front page headlines in recent years. If animal production systems are to be part of the future, animal scientists must join with society to solve these ethical issues. Traditional animal science curricula did not include methods to deal with these issues, but getting ethics into our curricula is imperative. For many of our undergraduate students, who by nurture or nature tend to think empirically, discussion of ethics is difficult. Many have gone through their entire college career without having to argue a position or express an opinion; and are uncomfortable with the idea of having to do so. It can be a challenge to fit ethics smoothly into our curriculums and to draw our students into meaningful discussions involving ethics. Couple this with some faculty who believe that their work is value-free and amoral, and that they are not responsible for the consequences resulting from their work, and the task can be daunting. Fortunately, many animal science departments are now moving towards incorporating ethical issue classes into the curriculum and there are more resources for those willing to take on the challenge.

Key Words: Bioethics, Education

247 A successful model for teaching ethics to animal science students. J. Tannenbaum*, *University of California*, *Davis*.

At the University of California at Davis, undergraduates who major in animal science and animal biotechnology are required to complete the author's upper division course in animal ethics. The course reflects a general approach that the author will argue can guarantee a successful and useful educational experience. The course is team-taught by an animal scientist and an ethicist. This enables the course to present and reinforce the fundamental principle that consideration of ethical issues relating to animal science requires an interweaving of empirical knowledge and information with ethical concepts and theory. The course begins with treatment of leading ethical theories in animal ethics. In this part of the course, students are required to read primary philosophical and religious texts that have influenced contemporary ethical attitudes towards animals. The next segment of the course considers topics in animal science essential to the consideration of issues in animal ethics, including animal sentience, animal pain, animal welfare, and environmental enrichment. The final section of the course combines ethical theory and empirical knowledge by focusing on four areas of special interest in animal science: animal agriculture, the use of animals in biomedical research, companion animals, and wild animals and the environment. These four areas are covered by the course leaders, as well as by animal scientists and veterinarians who demonstrate how scientists and those who care for animals in various contexts face ethical issues in their daily work. The course stresses critical thinking and writing skills. Students consider cases and problems relevant to the lectures in weekly discussion sections. They are required to do a substantial amount of writing in which they present and defend ethical positions relevant to important issues in animal science. This presentation will make specific suggestions about how to construct a successful course in animal ethics that animal science students will enjoy and can be required to take. The presentation will also suggest how existing courses might be improved.

Key Words: Ethics courses, Animal ethics, Teaching ethics

248 Animal welfare, bio-ethics and animal sciences. E. A. Pajor*, *Purdue University*, *West Lafayette, IN*.

Animal science students require a better understanding of how ethics plays a role in research, teaching, and extension activities. Teaching animal welfare within traditional animal science departments provides such an opportunity. Animal welfare is a unique subject area that combines objective scientific measures and ethics. Recent developments in animal agriculture are requiring that animal science departments develop a formal understanding of animal ethics and social values. One such development is the implementation of animal welfare standards

and audits. Another development is the fundamental change in the economic structure of how food is sold, the change from a push to a pull economy. Animal welfare and associated issues provide a valuable framework for ethical discussion and the possibility of teaching collaborations with social scientists.

Key Words: Animal welfare, Ethics, Teaching

Breeding and Genetics: Dairy Breeds

249 Crossbreds of Normande/Holstein, Montbeliarde/Holstein, and Scandinavian Red/Holstein compared to pure Holsteins for reproduction and survival. B. J. Heins, L. B. Hansen*, and A. J. Seykora, *University of Minnesota*, *St. Paul*.

Normande/Holstein, Montbeliarde/Holstein, and Scandinavian Red/Holstein crossbreds were compared to pure Holsteins for reproduction and survival. Cows were in 7 commercial dairies in California. Daughters of Normande, Montbeliarde, and Scandinavian Red sires were from imported semen. Holsteins were required to have a recorded sire with an NAAB code to assure they were sired by A.I. sires. For days open, cows were required to be at least 250 days in milk and those with greater than 250 days open were truncated to 250 days. Least squares means for days to first breeding were 69 for Holsteins, 62 for Normande/Holstein, 65 for Montbeliarde/Holstein, and 66 for Scandinavian Red/Holstein crossbreds, and differences were significantly different than pure Holsteins for Normande/Holstein and Montbeliarde/Holstein crossbreds. First service conceptions rates were 22% for Holsteins, 35% for Normande/Holstein, 31% for Montbeliarde/Holstein, and 30% for Scandinavian Red/Holstein crossbreds and, again, differences from Holstein were significant for the Normande/Holstein and Montbeliarde/Holstein crossbreds. Least squares means for days open were 150 for pure Holsteins, 123 for Normande/Holstein, 131 for Montbeliarde/Holstein, and 129 for Scandinavian Red/ Holstein crossbreds, and all three crossbred groups had significantly fewer days open than pure Holsteins. Crossbreds surpassed pure Holsteins for survival for any reason to 30-d, 150-d, and 305-d postpartum during first lactation and for percentage with a second lactation.

Key Words: Crossbreeding, Heterosis, Reproduction

250 Crossbreds of Jersey/Holstein compared to pure Holsteins for body weight, dry matter intake, feed efficiency, and body condition score. B. J. Heins, L. B. Hansen, A. J. Seykora*, A. R. Hazel, J. G. Linn, M. L. Raeth-Knight, and W. P. Hansen, *University of Minnesota*, *St. Paul*.

Jersey/Holstein crossbreds (n = 24) were compared to pure Holsteins (n = 19) for body weight (BW), dry matter intake (DMI), feed efficiency, and body condition score (BCS) during first lactation. Cows were housed in the University of Minnesota research facility at the St. Paul campus and calved from September 2004 to January 2005. Jersey/Holstein crossbreds and pure Holsteins were sired by 6 Jersey and 6 Holstein AI bulls selected for Net Merit. Pure Holsteins were taller (141.1 vs 134.2 cm) and had larger heart girths (187.5 vs 180.6 cm) than Jersey/Holstein crossbreds at calving. Cows were individually fed a TMR twice daily, and feed was mixed with a drum mixer. Feed weighbacks were collected once daily and cows were weighed bi-weekly. Milk production was recorded daily and milk composition was from monthly DHI. Best Prediction was used to calculate actual production (fat plus protein) for each cow for the first 150 d of first lactation. Fat plus protein production was 308 kg for Jersey/Holstein crossbreds and 309 kg for Holsteins. Ratio of fat plus protein production (kg) divided by DMI (kg) for the first 150 d of lactation was 0.11 for both Jersey/Holstein crossbreds and Holsteins. Body weights and body condition scores were recorded once every two weeks from 1 to 26 weeks postpartum. Independent variables were breed, random effect of cow within breed, week postpartum within breed, month of calving, and age at calving (linear, mo). Statistical analysis was performed for the first two weeks and 1 to 26 weeks. Holstein cows had significantly higher BW and significantly lower BCS than Jersey/Holstein crossbreds. There were no differences in DMI between Jersey/Holstein crossbreds and pure Holsteins.

Table 1.

Breed	1st two weeks BW (kg)	1 to 26 weeks DMI (kg/d)	BCS
Holstein	516.0	11.6	2.97
	508.0	19.1	2.80
Crossbred	472.7	11.5	3.14
	471.7	19.0	2.92

Key Words: Crossbreeding, Feed efficiency, Body condition score

251 Crossbreds of Jersey/Holstein compared to pure Holsteins for production, calving difficulty, stillbirths, and fertility. B. J. Heins, L. B. Hansen, A. J. Seykoa, A. R. Hazel*, J. G. Linn, D. G. Johnson, and W. P. Hansen, *University of Minnesota*, *St. Paul*.

Jersey/Holstein crossbreds (n = 77) were compared to pure Holsteins (n = 72) for 305-d milk, fat, and protein production, calving difficulty, stillbirths, days to first breeding, first service conception rate, and days open during first lactation. Cows were housed at two University of Minnesota research facilities and calved from September 2003 to May 2005. Jersey/Holstein crossbreds were bred to Montbeliarde sires, and Holstein cows were bred to Holstein sires. Best Prediction was used to calculate actual production (milk, fat, and protein) for 305-d lactations. Adjustment was made for age at calving and herd-year and records less than 305 d were projected to 305 d. Jersey/Holstein crossbreds (258 kg) and pure Holsteins (259 kg) were not significantly different for fat production, but pure Holsteins had significantly higher milk (7266 vs 6693 kg) and protein (229 vs 214 kg) production than Jersey/Holstein crossbreds. For fat plus protein production, the Jersey/Holstein crossbreds (471 kg) and pure Holsteins (488 kg) were not significantly different. Calving difficulty scores were 1, 2, 3 (no difficulty) and 4, 5 (calving difficulty), and stillbirths were 1 (alive) and 0 (dead) within 24 hr of birth. Age at calving, herd-year, sex of calf, and breed were