Session IV-3: Wildlife science and the Three Rs

Session IV-3: Oral presentations

IV-3-529

A mouse in the cage is not the same as the two in the bush!

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The Three Rs (Reduce, Refine, Replace) are ethical rules for assuring humane treatment of experimental animals and thereby help ensure good science. Although field studies are subject to the same rules, complexities of field research make it difficult to apply the Three Rs in that context. Most animals used in laboratory research were bred for that purpose, and are studied in research ultimately aimed at enhancing the quality of life for humans. In contrast, animals used in field studies are usually integral parts of existing populations, species, and ecological communities, and are studied in order to assess the impacts of human activities upon these populations and communities. Laboratory and field research ask different types of questions and often use different types of research designs. These differences make it problematic to apply laboratory-appropriate rules to field studies. We will discuss how the "distress" experienced differs between wild and "domesticated" research animals and some of the resulting consequences. We will explain why Replacement rarely happens in field studies, why Reduction is problematic, and why Refinement has been primarily techniques-based. We will also explore how differences in philosophical background lead to different perspectives on, and justifications for, animal use. Finally, we will sketch the parameters of a new "ecological ethic" which could synthesize and transcend both animal and environmental ethics.

IV-3-253

Molecular tools can obviate animal killing in biosystematics studies of anurans

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The biosystematics study includes identification, taxonomy and phylogeny. For the purpose of the biosystematics study of anurans (Class Amphibia) mass collection of individuals of a species and their preservation in formalin drums followed by taxonomic categorization using keys is the general practice. We use novel digital technique and molecular tools in biosystematics studies of anurans without killing and preservation of animals. The morphological and morphometric observations of anurans can be made very precisely using high resolution digital cameras and calibration software. Osteological studies can be performed using soft x-rays without killing the individuals. Recent developments in genomics have identified many marker genes. In anurans about 26 marker genes have been identified which

may be used in biosystematics studies. The technique for identification of these marker genes in anurans is based on isolation and characterization of DNA from a few cells without killing the animals. The cells obtained from the surface of the body or from a drop of blood produce DNA copies by PCR for partial or complete sequencing using an auto-sequencer. We have sequenced three marker genes namely 12s rDNA, 16s rDNA and Histone H4 of 12 anuran species of Thar Desert of Rajasthan, India, without killing or even disturbing the individuals. About 40 of our sequences have been released by NCBI. Molecular tools along with morphological and morphometric observations can be used as humane methods in biosystematics studies.

IV-3-343

Computer simulation models as an alternative to animal-based trap testing

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Animal trapping is done in virtually every country in the world for conservation, wildlife management, pest control, and obtaining fur, skin, or meat. The Agreement on International Humane Trapping Standards (AIHTS) was signed in 1997 by the European Union, the Russian Federation and Canada to ensure a sufficient level of welfare for trapped animals. The United States signed a separate but similar bilateral agreement with the European Union. The AIHTS applies to both killing and restraining traps for 19 listed species. Only traps certified as meeting the welfare thresholds of the AIHTS are allowed for use in Canada. The Fur Institute of Canada (FIC) is responsible for coordinating the implementation of the AIHTS on behalf of Canada. Since 1995, Alberta Innovates–Technology Futures has worked with the FIC on the development of computer simulation models for evaluating traps against the requirements of the AIHTS. These models were developed from a large database of historical information and are a scientifically valid and accurate alternative to animal-based testing. Models have been built for rating killing traps for 8 species listed on the AIHTS, including beaver, fisher, lynx, marten, muskrat, otter, raccoon, and short-tailed weasel. To date, these models have reduced the number of animals required for testing by over 1,400 and have resulted in savings of over $ 4 million.

IV-3-481

Biases in bear studies: A consideration of capture effects on research results

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Recent reports from several long-term wildlife studies challenge the assumption that potential adverse effects of research methods on animal welfare are limited to the short-term by demonstrating that the effects on individuals may have enduring consequences for populations. Further, these studies underscore a serious need to reconsider biases introduced by different capture and handling procedures to avoid erroneous interpretations of results.

To illustrate this latter point, we present results from two independent studies, one concerning grizzly bears (*Ursus arctos*) and the other polar bears (*U. maritimus*), in which body condition (a measure of health) and hair cortisol concentration (a measure of long-term stress) were analyzed in response to several potential predictor variables reflecting environmental condition. With grizzly bears, we looked specifically at measurements of habitat quality and human activity. With polar bears, we considered measures of sea-ice availability. Through similar types of analyses using data from both studies, we found that failure to account for the method of capture, in the case of grizzly bears, or the number of times an individual bear has been captured can lead to different results and, as a consequence, different interpretations of the data.

These examples should challenge persons engaged in wildlife capture to evaluate their capture procedures and research results carefully – from beginning to end. Significant capture-related effects may go undetected, providing a false sense of the welfare of released animals. Further, failure to recognize and account for long-term effects of capture and handling on research results can potentially lead to flawed interpretations.

IV-3-501

Ranking the negative impacts of wildlife control methods may help to advance the Three Rs

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Systematic evaluation and ranking of the negative animal welfare impacts associated with wildlife pest control methods may allow directed application of the Three Rs to reduce welfare compromise in study animals, extension of successful mitigation strategies to field use of the methods, and selection of preferred control methods. A comprehensive literature review on vertebrate toxic agents (VTAs) used to control mammalian pests in New Zealand provided information on the following: mode of toxic action; description of effects; time to loss of consciousness/death; and details of human poisonings. This information was used to evaluate impacts in each of five domains of potential animal welfare compromise according to an established methodology. This analysis revealed the following for a range of VTAs: the level of current knowledge of negative affective experiences caused in different species; gaps in understanding of such experiences; possible ways to identify those experiences; and questions about whether their severity can be judged. At present, application of the Three Rs to VTA studies would be hindered by uncertainty regarding consciousness. In particular, information on the period from the onset of symptoms to loss of consciousness, indicative of the duration of negative experiences, is inadequate. In addition, the level of consciousness during critical events, such as convulsions and respiratory compromise, is poorly understood. Suggestions are made regarding future research directions and approaches to fill knowledge gaps that will allow more accurate evaluation of welfare impacts and enhance the application of the Three Rs.

Session IV-3: Poster presentations

IV-3-483

Why is ecological ethics necessary?

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Certain moral problems regularly faced by conservation biologists and managers are not well addressed by theories within the disciplines of animal ethics, environmental ethics, or research ethics. In this paper we explain why this gap cannot be closed merely by tweaking these three disciplines – why a fourth discipline is necessary. Animal ethics maintains that animals are intrinsically valuable and highlights moral conflicts between the interests of animals and the interests of people. Similarly, environmental ethics focuses on ecosystem vs. people conflicts, and research ethics focuses on knowledge vs. people conflicts. Unfortunately, theories of animal ethics are blocked from acknowledging the intrinsic value of ecosystems and knowledge by their Kantian and Consequentialist roots. Theories of environmental ethics are blocked from acknowledging the intrinsic value of animals and knowledge by the holistic nature and complexity of ecosystems. Similarly, theories of research ethics cannot acknowledge the intrinsic value of either animals or ecosystems. Each discipline can give only lip-service to the intrinsic values championed by the other two. Thus neither animal ethics, nor environmental ethics, nor research ethics can handle the animal vs. ecosystem vs. knowledge dilemmas faced by conservation biologists and managers. A discipline that recognizes the intrinsic value of animals, ecosystems, and knowledge – ecological ethics – is necessary.