

STANDARD OPERATING PROCEDURE
ENVIRONMENTAL ENRICHMENT FOR SHEEP
USED IN RESEARCH AND TEACHING

1.0 PURPOSE:

- 1.1 This standard operating procedure (SOP) describes the methods for environmental enrichment of sheep (*Ovis aries*) used for research and teaching purposes.
- 1.2 These methods are intended to improve the well-being of these animals by increasing species-specific behaviors and reducing maladaptive behaviors.
- 1.3 This SOP is part of the UGA Environmental Enrichment Program that fully complies with the requirements of the National Research Council, *Guide for the Care and Use of Laboratory Animal*, ed8 available at <http://grants.nih.gov/grants/olaw/Guide-for-the-Care-and-Use-of-Laboratory-Animals.pdf> and the Animal Welfare Act and Regulations: Public Law 99-198 – The Improved Standards for Laboratory Animal Act available at <http://www.nal.usda.gov/awic/legislat/awa.htm> .

2.0 STANDARDS:

2.1 Natural Behavior:

Domestic sheep (*Ovis aries*) are relatively small ruminants with crimped hair, called wool. Domestic sheep differ significantly from their wild relatives due to thousands of years of selective breeding by humans. (Budiansky, 1999) Sheep have great hearing and are very sensitive to noise when being handled (Smith, 1997) They have a wide range of vision, somewhere between 270 degrees and 320 degrees, but poor depth perception. (Shulaw, 2006) They have a tendency to move out of the dark and toward lighted areas. (Brown and Meadowcroft, 1996) They will also seek higher ground, uphill when disturbed. They will often flock when threatened. They have an excellent sense of smell. Sheep are exclusive herbivores with a four-compartment stomach (ruminant). As ruminants, they are proficient at digestion of plant cellulose due to their ability to regurgitate their food, chew their “cud” and then re-swallow for specialized microbial digestion in the rumen compartment of their stomach. Sheep prefer to graze on grass and other short roughage, avoiding taller woody parts of the plants. They do well on monoculture pastures with a single type of vegetation. (Pugh, 2001) Sheep are highly social animals and do poorly if isolated. They communicate primarily through vocalizations and olfactory cues. Bleats of individual sheep are distinctive. (Fraser and Broom, 1997)

2.2 Environmental enrichment must be evaluated by taking into account the following:

- 2.2.1 The Natural Behavior and needs of sheep (see above)
- 2.2.2 Social Enrichment – Housing of compatible co specific offers a high level of enrichment. Every effort will be made socially house social species. If social housing is not possible, animals should be housed in a manner that allows for as much tactile, auditory, visual or olfactory contact as possible. Social housing is a recognized and important part of the Environment Enrichment Program but should not be viewed as the sole means of meeting the enrichment needs of animals.
- 2.2.3 Physical Enrichment (devices, toys, etc) – Physical enrichment can be an important part of the Environmental Enrichment Program. However the selection of physical enrichment should take into account the safety of the device, its ability to stimulate and maintain the animal’s interest and its impact on the research

being conducted. Physical enrichment should be carefully monitored to assess its impact of the goals of increasing natural behaviors.

- 2.2.4 Activity/Food Enrichment – Activity/food enrichment can be an important part of the Environmental Enrichment Program. However, the selection of activity/food enrichment should take into account the health of the animal, the limitations of its confines and its impact on the research being conducted. Any activity/food enrichment should be planned in consultation with the Attending Veterinarian (AV) and the Principal Investigator (PI).
- 2.3 The enrichment program is carried out by University Research Animal Resources (URAR). Specific needs and requirements should be communicated to the Assistant Director of the Animal Resources (AR) Unit.
- 2.4 Unless specifically justified by the PI in the Animal Use Proposal (AUP), all animals will receive enrichment. It is recognized that animal enrichment can be a research variable. In caring for the psychological well-being of animals, it is important to recognize limitations and use a balanced approach in providing the best possible care and allowing for the expression of species-typical behavior within a functioning research environment.
- 2.5 Abnormal Behaviors:

The Environmental Enrichment Program is a dynamic process. Ongoing evaluation is a necessary component to meeting the goal of more species-specific natural behaviors. University Research Animal Resources (URAR) will regularly monitor all enrichment, in part, by looking for stereotypical behaviors that might indicate animal stress or maladaptation to the laboratory environment.

Abnormal behaviors in sheep include:

- Wool biting, wool sucking
- Self-sucking (tails or udders)
- Apathy and Anorexia

When these behaviors are observed, URAR will evaluate the need for additional environmental enrichment. All changes to enrichment will be approved by the AV and the PI. Enrichment changes will be made for all animals on study, in order to minimize research variability, even if all of the animals are not showing the stereotypical behavior.

3.0 PROCEDURES:

- 3.1 Social Enrichment – As a social species, sheep social housing will be considered the default method of housing unless otherwise justified based on social incompatibility resulting from inappropriate behavior, veterinary-related concerns regarding animal well-being, or scientific requirements approved by the UGA Institutional Animal Care and Use Committee. – ***most important enrichment for sheep**
- 3.2 Physical Enrichment – Sheep do not seem to respond to toys or artificial objects in their environment. In fact, studies have shown that objects such as mirrors may increase stress (Reinhardt and Reinhardt, 2002)

- 3.3 Activity/Food Enrichment - in order of preference
- 3.3.1 Feeding or licking device to provide feed supplement when pushed with head – must be cleaned daily

4.0 RECORDS:

The Animal Care Staff will log provision of enrichment daily according to their facility specific documentation records.

5.0 DEFINITIONS AND REFERENCES:

5.1 Definitions:

- 5.1.1 Animal Use Proposal (AUP): a detailed written description of the procedures involving the use of animals in a research or instructional project.
- 5.1.2 Attending Veterinarian (AV): the veterinarian responsible for the health and well-being of all laboratory animals used at the institution
- 5.1.3 Enrichment: a method of providing animals with the opportunity to behave as they do in the wild, playing, foraging, grooming, and interacting in other ways with one another.
- 5.1.4 Principal Investigator (PI): the scientist who plans and coordinates all phases of the research or instructional work and the protocol.
- 5.1.5 Standard Operating Procedure (SOP): a set of standardized instructions for dealing with routine laboratory procedures

5.2 References:

- Animal Welfare Act and Regulations: Public Law 99-198 – The Improved Standards for Laboratory Animal Act (<http://www.nal.usda.gov/awic/legislat/awa.htm>)
- Brown, D. and Meadowcroft, S. (1996) *The Modern Shepherd*. Farming Press
- Budiansky, S. (1999) *The Covenant of the Wild: Why animals chose domestication*. Yale University Press
- Federation of Animal Science Societies, Guide for the Care and Use of Agricultural Animals in Research and Teaching, ed. 3 available at www.fass.org/docs/agguide3rd/Ag_Guide_3rd_ed.pdf
- Fraser, A.F and Broom. D.M. (1997) *Farm Animal behavior and welfare*, 3rd ed. CABI Merck Manual at <http://www.merckmanuals.com/vet/behavior.html>
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- Pugh, D. (2001) *Sheep & Goat Medicine*. Elsevier Health Sciences
- Reinhardt, V. and Reinhardt, A. (2002) *Comfortable quarters for sheep in research institutions: Comfortable Quarters for Laboratory Animals*. Animal Welfare Institute
- Shulaw, W.P. (2006) *Sheep Care Guide*. American Sheep Industry Association
- Smith, M.S. et al. (1997) *Beginning Shepherd's Manual*, 2nd ed. Iowa State University Press