

## STANDARD OPERATING PROCEDURE

### ENVIRONMENTAL ENRICHMENT FOR SNAKES USED IN RESEARCH AND TEACHING

#### 1.0 PURPOSE:

- 1.1 This standard operating procedure (SOP) describes the methods for environmental enrichment of snakes (*subOrder:Serpentes*) 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:

Snakes are elongated, legless, carnivorous reptiles of the suborder *Serpentes*. They have no eyelids or external ears. They have overlapping scales and, like all reptiles, are ectothermic, controlling their body temperature through their ambient environment. Snakes will shed their skin to replace worn out scales and get rid of parasites, mites and ticks. Snakes are found on every continent except Antarctica, with the exclusion of some islands. There are currently over 3400 species of snakes. (ITIS report, 2008) Some hunt using potent venom and some swallow live prey or kill by constriction. All are competent hunters but have a varied diet depending on their natural habitat. Therefore, it is important that the individual species is taken into account when determining the nutritional requirements for a particular snake. Snakes can be classified into three broad categories: aquatic, burrowing and terrestrial. All snakes use their forked tongues to collect particles to smell, using a special organ within the mouth known as Jacobson's organ. Snakes are also very sensitive to vibrations. (Cogger and Zweifel, 1992)

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

- 2.2.1 The Natural Behavior and needs of snakes (see above)
- 2.2.2 Social Enrichment – Most snake species are not social animals, though they may congregate for food, shelter or hibernation.
- 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 snakes include:

- Decreased activity
- Anorexia
- Skin that doesn't shed

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 – Snakes are usually not group housed.
- 3.2 Physical Enrichment for Aquatic Snakes - in order of preference
- 3.2.1 Water area for swimming with access to dry area for basking
- 3.2.2 Rocks for basking and removal of skin
- 3.2.3 Climbing structures, such as rocks or sturdy branches
- 3.3 Physical Enrichment for Burrowing Snakes - in order of preference
- 3.3.1 Brown paper bag with leaves for burrowing and concealment
- 3.3.2 Rocks for basking and removal of skin
- 3.3.3 Damp soil box at least 8” deep for burrowing
- 3.3.4 Vegetation, pine straw or twigs for burrowing
- 3.3.5 Artificial hiding box
- 3.4 Physical Enrichment for Terrestrial Snakes- in order of preference
- 3.4.1 Vegetation for hiding
- 3.4.2 Climbing structures, such as rocks or sturdy branches
- 3.4.3 Rocks for basking and removal of skin
- 3.4.4 Brown paper bag with leaves for burrowing and concealment

- 3.4.5 Artificial hiding box
- 3.5 Activity/Food Enrichment- in order of preference
  - 3.3.1 Warm prey, hidden to encourage hunting
  - 3.3.2 Live prey, if warmed prey is not palatable

#### 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>)
- Cogger, H. and Zweifel, R. (1992) *Reptiles and Amphibians*. Welden Owen
- Hoegrefe, S. (2012) *Pantherophis guttatus*: Animal Diversity Web at <http://animaldiversity.ummz.umich.edu>
- ITIS report (2008) *Serpentes: Integrated Taxonomic Information System* at [www.itis.gov](http://www.itis.gov)
- National Research Council, *Guide for the Care and Use of Laboratory Animals*, ed 8 available at <http://grants.nih.gov/grants/olaw/Guide-for-the-Care-and-Use-of-Laboratory-Animals.pdf>
- Reptile Database (2013) at [www.reptile-database.org](http://www.reptile-database.org)
- Vause, Kathy (2013) *Reptile Enrichment at the Riverbanks Zoo* at <http://reptilebehavior.com/riverbankspaper.htm>