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| IACUC Guidance: | <b>TAMU-G-012</b>                                  | Title:         | <b>Suggestions for Environmental Enrichment of Agricultural Species</b> |  |
|                 | Location   | Effective Date | Review By   |  |
|                 | <b>College Station/Dallas/Galveston/Kingsville</b> | 11/01/2024     | 10/31/2027  |  |
|                 | <b>Houston</b>                                     | N/A            | N/A   |  |

**1. PURPOSE**

- 1.1. The primary aim of environmental enrichment is to enhance animal well-being by providing animals with sensory and motor stimulation, through structures and resources that facilitate the expression of species-specific behaviors, and promote psychological well-being through physical exercise, manipulative activities, and cognitive challenges according to species-specific characteristics.
- 1.2. The purpose of this guidance is to suggest the implementation of environments that meet physical and psychological needs and provide environmental considerations for social species of agricultural animals at Texas A&M University.

**2. SCOPE**

- 2.1. Applies to indoor- or outdoor-housed agricultural species as defined by this guidance and covered by the Ag Guide under the oversight of the Texas A&M University IACUC.
- 2.2. An enrichment program for agricultural animals as defined by this guidance is encouraged, but not required.
- 2.3. See TAMU-G-027 Guidelines on Environmental Enrichment, Single Housing of Social Species Housed Indoors for enrichment *requirements* for USDA-covered and biomedical species housed indoors.

**3. RESPONSIBILITY**

- 3.1. To incorporate an animal enrichment plan, the **PIs** and/or **Core Support Unit Managers** should plan, provide, test, and maintain safe, species-specific enrichment programs/items that provide for the physical and social needs of agricultural research and teaching animals.
- 3.2. Although environmental enrichment of agricultural species is not required, the **IACUC** oversees the health and welfare of all animals owned by the university and retains the authority to review and deny enrichment deemed unsafe.

**4. DEFINITIONS AND/OR ACRONYMS**

- 4.1. **Ag Guide:** Guide for the Care and Use of Agricultural Animals in Research and Teaching. Primary reference document for meeting the needs and requirements of agricultural animals utilized in production agriculture related research and teaching.
- 4.2. **Agricultural Species:** Agricultural animals used in research and teaching activities related to food or fiber production, breeding, management or production efficiency; includes animals used for teaching veterinary medical students at working farms, ranches, veterinary hospitals, or shelters.
- 4.3. **AV:** Attending Veterinarian. Individual designated by Texas A&M University to fulfil the regulatory role of AV. May also describe veterinary staff who report directly to, and have delegated authority from, the AV.
- 4.4. **Conspecifics:** Animals of the same species.
- 4.5. **Core Support:** Individuals performing professional activities such as husbandry or technical services as a function of a dedicated service organization.
- 4.6. **Director/Manager of Core Support Unit:** Faculty or staff member that has direct responsibility for an animal facility, and serves as the point-of-contact for the AV and the IACUC in matters related to animal facility management, animal health concerns, and compliance with animal care and use protocols.
- 4.7. **Environmental Enrichment:** The deliberate, variable, and scheduled additions to an animal's environment with which it can interact. The goal is to allow animals to express a range of species-typical behaviors which may enhance their well-being.

- 4.8. **IACUC:** The Institutional Animal Care and Use Committee. Institutional body responsible for ensuring adherence to federal regulation and institutional policy relating to the care and use of animals in teaching, testing and research. Appointed by the Institutional Official.
- 4.9. **PI:** Principal Investigator. The individual who has ultimate administrative and programmatic responsibility for the design, execution, and management of a project utilizing vertebrate animals.
- 4.10. **Single Housing:** Maintaining an animal in a primary enclosure by itself with additional visual, auditory, olfactory, and/or tactile contact of conspecifics housed within the same area.
- 4.11. **Social Enrichment:** Appropriate social interactions among conspecifics, which are essential to normal development and well-being.
- 4.12. **Social species:** Any species known to naturally live and interact with conspecifics. The majority of research animals are considered social species, including but not limited to the following: most rodents (mice, rats, guinea pigs), rabbits, ferrets, cats, dogs, goats, pigs, cattle, sheep, chickens, turkeys, nonhuman primates, and aquatics (frogs and fish).
- 4.13. **Solitary Housing:** Housing an animal in a primary enclosure alone in the absence of any other animals within visual and scent range.
- 4.14. **SOP:** Standard Operating Procedure.
- 4.15. **Standard housing (Ag Species):** The type(s) of housing approved by the IACUC and provided by campus animal facilities, for general use (varies by species).
- 4.16. **USDA:** United States Department of Agriculture. USDA Animal Care, a unit under the Animal and Plant Health Inspection Service, administers the Animal Welfare Act (AWA) and associated Animal Welfare Act Regulations (AWAR).
- 4.17. **USDA Regulated:** Species or activities which fall under the AWA/AWAR.

## 5. GUIDELINES OR PROCEDURE

- 5.1. To provide for the physical and social needs of agricultural research and teaching animals, the IACUC *recommends* that appropriate environmental enrichment be provided for animals that are socially isolated or where the physical environment of the animal is lacking complexity or fails to meet behavioral needs.
- 5.2. The appropriateness of specific environmental enrichment is determined by the species used, type of housing, space available, research needs, standard husbandry practices and other operational issues.
  - 5.2.1. Examples of environmental enrichment include (see Table 1):
    - 5.2.1.1. Group housing of compatible animals
    - 5.2.1.2. Providing animals with a means for control over their environment (e.g., nest-building materials, hiding places)
    - 5.2.1.3. Novel items (e.g., toys, special food treats)
    - 5.2.1.4. Opportunity for exercise (e.g., pasture, climbing structures)
- 5.3. Social enrichment involves direct or indirect (visual, olfactory, auditory) contact with conspecifics or humans.
  - 5.3.1. Full time social housing is the preferred and expected method for housing social species.
  - 5.3.2. Single housing of social animals should be limited and provide a combination of visual, auditory, olfactory, or tactile contact of conspecifics, when possible.
  - 5.3.3. Examples of social enrichment include:
    - 5.3.3.1. Part time access to conspecifics, where appropriate (e.g., overnight, when the animals are between studies, defined periods of time during the day, etc.)
    - 5.3.3.2. Protected contact that allows interaction of conspecifics through some type of perforated barrier
    - 5.3.3.3. Positive interaction with animal care personnel
    - 5.3.3.4. Requires responsible staff to be well-trained in the recognition and intervention of aggressive and associated behaviors

- 5.3.3.5. Additional enrichment is recommended for singly housed animals unless exempted for health or veterinary reasons. See Table 1 for examples.
- 5.4. Occupational enrichment includes physical and psychological supplementation such as:
  - 5.4.1. Devices that provide animals with control or challenges
  - 5.4.2. Enrichment that encourages exercise.
- 5.5. Physical enrichment involves altering the size or complexity of an animal’s enclosure or adding objects, substrate, or permanent structures such as perches and nestboxes.
- 5.6. Sensory enrichment involves visual stimuli, auditory, or in other modalities.
  - 5.6.1. Television or video
  - 5.6.2. Music, vocalizations
  - 5.6.3. Olfactory, tactile, taste
- 5.7. Nutritional enrichment involves providing varied or novel food types or changing the method of food delivery.
- 5.8. Enrichment Plan
  - 5.8.1. Enrichment strategies should:
    - 5.8.1.1. Be science-based with understanding of species-specific behavior and psychology.
    - 5.8.1.2. Increase the number and range of normal behaviors
    - 5.8.1.3. Reduce abnormal or stress behaviors (e.g., weaving, pacing, route-tracing, wool eating, wood chewing, cribbing, bar biting, tongue-rolling, feather pecking, cannibalism)
    - 5.8.1.4. Increase space utilization
    - 5.8.1.5. Enhance the animal's ability to cope with behavioral and physiological challenges such as exposure to humans, experimental manipulation, or environmental variation. General considerations:
      - 5.8.1.5.1. Define conditions under which an item can be provided
      - 5.8.1.5.2. Provide a variety of enrichment types and utilize a rotating schedule
      - 5.8.1.5.3. Monitor animal health and behavior to evaluate effectiveness of enrichment
      - 5.8.1.5.4. Ensure enrichment items are regularly inspected for cleanliness, wear, and tear and remain safe
- 5.9. Investigators are highly encouraged to seek advice from the AV regarding enrichment strategy
- 5.10. Table 1

| SPECIES            | EXAMPLES OF APPROPRIATE AGRICULTURAL SPECIES-SPECIFIC ENVIRONMENTAL ENRICHMENT  |
|--------------------|---|
| <b>ALL SPECIES</b> | <ul style="list-style-type: none"> <li>• <b>Group-housed*</b> if compatible to provide social enrichment. Should be augmented where possible with additional modalities.</li> <li>• Enrichment items or devices should be non-toxic/harmful, disposable or sanitizable.</li> <li>• Limit single housing of social animals and provide a combination of visual, auditory, olfactory, or tactile contact of conspecifics, when possible.               <ul style="list-style-type: none"> <li>▪ Additional enrichment is recommended for singly housed Ag animals unless prevented by scientific or veterinary reasons.</li> </ul> </li> </ul>  |
| <b>PIGS</b>        | <ul style="list-style-type: none"> <li>• <b>Group-housed*</b> if pen size is adequate and if animals arrive together</li> <li>• <b>Social contact*</b> with other pigs if possible</li> <li>• Sanitizable toys (e.g. Kong(R) toys, plastic balls)</li> <li>• Small amounts of food treats such as fresh vegetables, yogurt or fruit, including hidden food treats</li> <li>• <b>Positive human interaction*</b> (e.g. scratching back) if pigs are acclimatized to this</li> <li>• <b>A warm, artificial udder*</b> with flexible nipples can decrease distress in piglets that must be weaned at an early age for experimental reasons.</li> <li>• Opportunities to forage, explore, nest-build, play</li> <li>• Cognitive and/or manipulative activities</li> <li>• Access to soil, straw, peat, mushroom compost, hay, bark, branches, logs</li> </ul> |



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|   | <ul style="list-style-type: none"> <li>• Novel, sanitizable (hanging) objects</li> <li>• Increased space or appropriate subdivision of enclosure area</li> <li>• Multi-level pen</li> <li>• Good quality, well-managed bedding</li> <li>• Artificial lying mats</li> <li>• Snout coolers, or snout-operated showers</li> </ul>  |
| <b>SHEEP/GOATS</b>                            | <ul style="list-style-type: none"> <li>• <b><i>Stainless steel mirrors*</i></b> can reduce but do not abolish the physiological stress response to social isolation in sheep</li> <li>• It has been suggested that a mirror or an <b><i>inanimate object covered with animal skin*</i></b> could serve as a social surrogate.</li> <li>• <b><i>Positive human interaction*</i></b></li> <li>• Sanitizable feed dispensers</li> <li>• Hanging chains</li> <li>• Sanitizable toys</li> <li>• Playing music</li> <li>• Climbing structures (goats)</li> </ul> <p><b><i>Note: A mirror image could cause social stress, if the reflection is considered a strange individual.</i></b></p>   |
| <b>CATTLE</b>                                 | <ul style="list-style-type: none"> <li>• Mechanical brushes or hanging balls</li> <li>• Opportunity to exercise and forage</li> <li>• Sensory enrichment including quiet environments, music</li> <li>• Mirror image or images of familiar cattle</li> <li>• <b><i>Interaction with gentle, confident handlers*</i></b></li> </ul>  |
| <b>HORSES</b>                                 | <ul style="list-style-type: none"> <li>• Sanitizable toys</li> <li>• Sanitizable treat dispensers (round or polyhedral designs are most effective)</li> <li>• Equine Appeasement Pheromone product is commercially available but there is minimal evidence of efficacy</li> <li>• Adequate exercise (hand-walking, lunging, or turning out into a paddock)</li> <li>• Opportunity to forage</li> <li>• Horses bedded on straw perform less stereotypic behavior than on paper/shavings</li> <li>• <b><i>In horses with learned positive associations with humans*</i></b>, brushing or scratching the withers/neck region can mimic mutual grooming.</li> <li>• <b><i>Lateral visual contact with other equids, or mirrors, or life-sized poster images of a horse's face*</i></b></li> </ul> |
| <b>POULTRY</b>                                | <ul style="list-style-type: none"> <li>• Sanitizable perches or other elevated surfaces</li> <li>• Provide floor-housed chickens with cover</li> <li>• Sanitizable nestboxes</li> <li>• Substrate/ dustbath</li> <li>• Opportunities to forage</li> <li>• Provide hay bales and string</li> <li>• Swimming water (ducks)</li> <li>• Novel objects can be introduced but with caution to older birds</li> <li>• Bright, color, complex, moving video images</li> <li>• Possibly playing music, although data is lacking</li> <li>• <b><i>Socialization of poultry with humans can be carried out with relative ease by frequent exposure to kind, gentle care*</i></b></li> </ul>  |
| <b>*DENOTES EXAMPLES OF SOCIAL ENRICHMENT</b> |   |

**6. RECORDS**

6.1. Research records, including records related to the provision of enrichment, must be maintained consistent with Texas A&M University Standard Administrative Procedures (SAPS) 15.99.03.M1.03. and 29.01.03.M0.01



**7. EXCEPTIONS**

- 7.1. The PI may request an exception to the above standards by describing the departure in the AUP
- 7.2. For programmatic exceptions, the facility director or manager may submit a request for the exception using TAMU-F-013

**8. REFERENCES, MATERIALS, AND/OR ADDITIONAL INFORMATION**

- 8.1. CITI: <https://about.citiprogram.org/en/homepage/>
  - 8.1.1. Sheep & Goats: CITI Working with Sheep and Goats in Research Settings
  - 8.1.2. Horses: CITI Working with Horses in Agricultural Research Settings
- 8.2. [Guide for the Care and Use of Agricultural Animals in Research and Teaching](#)
- 8.3. AALAS Webinar. Susie Vogel. August 20, 2019. Agricultural Animals: Enrichment Strategies. <https://www.aalas.org>
- 8.4. Bio-Serv: <https://www.bio-serv.com/enrichment.html>
- 8.5. USDA APHIS Environmental Enrichment Plan Inspection Checklist: [https://www.aphis.usda.gov/animal\\_welfare/downloads/Animal-Care-Inspection-Guide.pdf](https://www.aphis.usda.gov/animal_welfare/downloads/Animal-Care-Inspection-Guide.pdf)
- 8.6. TAMU ANSC 404: Behavior and Management of Domestic Species, course materials
- 8.7. **Texas A&M University SAPs:**
  - 8.7.1. [15.99.03.M1.03](#) The Responsible Stewardship of Research Data
  - 8.7.2. [29.01.03.M0.01](#) Security of Electronic Information Resources
- 8.8. [IACUC/AWO Referenced Documents](#)
  - 8.8.1. TAMU-F-013 Request for Programmatic Exception from Animal Welfare Standards
  - 8.8.2. TAMU-G-027 Guidelines on Environmental Enrichment, Single Housing of Social, Biomedical Species Housed Indoors

**9. HISTORY**

| Effective Date | Version # | Description   |
|----------------|-----------|---|
| 12/01/2021     | 000       | College Station/Galveston: New document   |
| 03/24/2022     | 001       | College Station/Dallas/Galveston: Merging of Dallas animal care and use program with College Station/Galveston                        |
| 10/20/2022     | 002       | College Station/Dallas/Galveston/Kingsville: Merging of Kingsville animal care and use program with College Station/Dallas/Galveston. |
| 11/01/2024     | 003       | College Station/Dallas/Galveston/Kingsville: Renewal; updated scope, definitions and resources sections; addition of records section. |