

ENVIRONMENTAL ENRICHMENT PROGRAM FOR SWINE**1. PURPOSE**

The intent of this Standard Operating Procedure (SOP) is to describe an appropriate environmental enrichment program for swine.

These methods are intended to improve the well-being of these animals by increasing species-specific behaviors and reducing undesirable behaviors.

2. RESPONSIBILITY

- 2.1 Facility Animal Care Committee (FACC)
- 2.2 Veterinarian
- 2.3 Principal Investigator (PI)
- 2.4 Research personnel
- 2.5 Animal Care Personnel
- 2.6 Animal Care Committees (FACC)

3. CONSIDERATIONS

- 3.1 The purpose of environmental enrichment is to provide swine with opportunities to express basic behavior needs, to promote species-typical, non-injurious, behavior and to promote physical and mental health thus enhancing animal welfare. Environmental enrichment should be biologically relevant, i.e., foraging, rooting, socializing, so that it does not lose its enriching value over time.
- 3.2 The environmental enrichment program must be approved by a veterinarian. This includes enrichment provided within the animal facility, provided as part of an Animal Use Protocol (AUP), or provided in Alternative Locations for Procedures and Housing of Animals (ALPHA) locations.
- 3.3 Deviation or exemption from this environmental enrichment program must be scientifically justified in the AUP and approved by the FACC or prescribed for medical reasons by a veterinarian.
- 3.4 Environmental Enrichment refers to the provision of stimulating and responsive environments through structures and resources above the basic conditions that meets the animal's physical, psychological and social needs and facilitates the expression of species-typical behaviors.
- 3.5 The natural behavior, characteristics and needs of swine include:
 - 3.5.1 Rooting: is one of the most important activities for pigs; it is performed to forage, sows root to build a nest, and rooting may also have some thermoregulatory functions.
 - 3.5.2 Chewing objects in the environment.
 - 3.5.3 Play is a positive indicator of welfare, and it is very important, especially for young pigs. Providing objects to play with in the piglets' environment may improve their social skills.
- 3.6 Undesirable behaviors and stereotypies that might indicate animal stress or maladaptation to the environment include:
 - Aggression
 - Cannibalism
 - Tail biting
 - Pacing
 - Bar biting
 - Vacuum chewing (chewing when nothing is present)

3.7 TYPES OF ENRICHMENT:

- 3.7.1 SOCIAL ENRICHMENT: involves either direct or indirect (visual, olfactory, auditory) contact with other pigs and altering the sensory environment (e.g., leaving a radio on, or providing separate areas for feeding, resting and dunging).
- 3.7.2 OCCUPATIONAL ENRICHMENT: encompasses both psychological enrichment that provides animals with control or challenges (e.g. devices) and enrichment that encourages exercise. (pen walking by personnel, puzzle feeders).
- 3.7.3 PHYSICAL ENRICHMENT: can involve altering the animals' enclosures or adding accessories such as objects, substrate or permanent structures (e.g. nest boxes)
- 3.7.4 SENSORY ENRICHMENT: visual, auditory, olfactory, tactile and taste stimuli.
- 3.7.5 NUTRITIONAL ENRICHMENT: involves either presenting varied or novel food types or changing the method of food delivery.

4. PROCEDURES

- 4.1 Pigs must be provided with at least 2 forms of enrichment at all stages of development in addition to social housing. Their motivation to interact with enrichment is expected to be different due to nutritional status combined with their social dominance relationships.
 - 4.1.1 Provide enrichment in early, neonatal housing conditions. This may lead to better social behavior at later stages of the pig's life.
 - 4.1.2 Provide access to enrichment at the pre-weaning period. In addition to positively affecting piglets' growth, it may be effective in the reduction of
 - nosing and tail biting
 - mounting
 - oral manipulation directed at other individuals, as well as.
 - 4.1.3 Suitable forms of enrichment vary with each stage of production and with housing system being used. See the [Table 1: Environmental Enrichment Examples for enrichment suggestions](#).
- 4.2 Environmental enrichment must be selected and planned in consultation with the Veterinarian and the Principal Investigator (PI).
- 4.3 Additional elements that may enrich the animals' environment may be provided if described in the AUP and approved by the FACC. . Selection requires careful consideration of;
 - 4.3.1 Suitability for the species and that satisfy basic behavioural needs of the animal(s).
 - 4.3.2 Sanitizable, resistant to disinfectants
 - 4.3.3 Hazards (risk of entanglement, injury, escape, choking, toxicity,)
 - 4.3.4 Durability
 - 4.3.5 Not ingestible (unless it is food based)
 - 4.3.6 Personnel safety (e.g., size, sharp edges,)
 - 4.3.7 Biosecurity (transmission of pathogens)
 - 4.3.8 Health (e.g. Nutritional enrichment)
 - 4.3.9 Quantity and size: in relation to group size (to prevent competition and frustration).
 - 4.3.10 Impact on Research.

- 4.3.11 Accessibility
- 4.3.12 The potential for affecting liquid manure systems
- 4.4 Decisions to implement enrichment strategies should not be based on convenience where the result is to the detriment of animal welfare.
- 4.5 PROPERTIES OF ENRICHMENT: In order to satisfy a pig's innate need to forage, enrichment needs to have certain properties: (See [Table 1: Enrichment that can be added to enhance a farming system for poultry](#) for examples)
 - Ingestible
 - Destructible
 - Odorous
 - Chewable
 - Malleable
- 4.6 Do not use steel-belted radial tires as an enrichment. The steel in these tires may become exposed, break off in small pieces, and become embedded in the animals.
- 4.7 Social Contact:
 - 4.7.1 Pigs are social animals and should be housed in age and size appropriate groups as much as possible. Pigs must be housed in a manner that allows for as much tactile, auditory, visual or olfactory contact as possible.
 - 4.7.2 Exceptions require scientific, welfare or medical justification:
 - 4.7.2.1 Incompatibility (aggression)
 - 4.7.2.2 Medical reasons
 - 4.7.2.3 Specific protocol approved by the FACC.
 - 4.7.3 Positive human interaction should be provided on a regular basis, to encourage appropriate human socialization and reduce fearfulness.
- 4.8 Housing:
 - 4.8.1 Animals should be housed with the goal of maximizing species-specific behaviors, minimizing stress-induced behaviors, providing opportunity for social contact and locomotor and exploratory behaviors. Cages should be of a sufficient size and complexity to allow swine to be housed in appropriately sized groups and to perform behaviors important to their welfare.
 - 4.8.2 The housing system should meet the stocking density requirements and minimum space allowance of the current Canadian Council on Animal Care (CCAC) Guidelines: Farm Animals, as well as the standards set forth by the National Farm Animal Care Council (NFACC) and Codes of Practice for Swine.
 - 4.8.3 Provide substrate (e.g., hay, peat, mushroom compost, silage, sawdust and straw) in which pigs can express foraging behaviour (rooting, grazing and exploring with the snout). When bedding cannot be provided, the combination of different kinds of enrichments should be used. Note: Straw serves multiple purposes for providing bedding, nutrition, and enrichment.
 - 4.8.4 Increasing environmental complexity with partitioning may be useful in reducing agonistic interactions and provides animals with the opportunity to express their natural thigmotactic behaviour.
- 4.9 Young pigs (particularly weaned pigs):
 - 4.9.1 Provide outlets for chewing, biting, nosing and sucking to deter them from directing their natural oral-nasal behaviour toward the bodies of pen-mates. (E.g., straw, commercially available tail chews, foam rubber matting or other fibrous materials)

4.10 Sows:

4.10.1 The barren gestation stall can lead to undesirable behavior (see Section 3.2). Enhancements to the environment should be carefully considered and designed for satisfying the oral behavioural needs and comfort of the sow as well as overall practicality. For example, small hanging chains or chewable material, secured in gestation stalls and in farrowing crates, will be used by sows instead of chewing on the bars which can result in broken teeth.

4.11 Suspend or attach objects at eye level or floor level to objects from getting stuck in corners, behind feeders, or pushed into neighboring pens where pigs cannot reach them.

4.12 Position enrichment near, but not directly in, areas used for eating, drinking, and elimination. This ensures active pigs don't disturb sleeping ones and keeps enrichment from getting soiled with manure.

4.13 Enrichment objects should match the age and size of the pigs; if too small, pigs may struggle to interact effectively, reducing their enrichment benefits.

4.14 Ensure there is a sufficient availability (scarcity can lead to social competition, aggression, or restlessness) and suitability (age, size) of the enrichment.

4.15 Sanitize objects during regular husbandry. Soiled objects have little enrichment value to pigs.

4.16 Renew and replace objects and materials when they are no longer being used or they are depleted (or eaten), soiled or worn out to ensure the animals maintain interest and receive the benefits of the enrichment.

4.17 Provision, changes and sanitation schedules for environmental enrichment objects and furnishings must be documented.

4.18 Assessment is conducted by the veterinarian, Animal Care personnel and research personnel to evaluate if it is having the intended effect by

4.18.1 Identifying stereotypical behaviors that might indicate animal stress or maladaptation to the environment as described in Section 3.2.

4.18.2 Checking access to enrichment using the following indicators:

4.18.2.1 Animal Indicators: such as the presence of

- Bitten nails,
- Skin lesions,
- Abnormal behavior
 - Low level of interest in the enrichment provided
 - Aggression
 - Vocalization
 - Biting elements other than the enrichment provided
 - Rooting feces
 - Increase in false nest building behavior (sows); and

4.18.2.2 Non-animal indicators:

- Frequency of renewal
- Accessibility
- Quantity, and;
- Cleanliness.



Table 1: Enrichment that can be added to enhance a farming system for poultry (in addition to basic system properties)






Species (type)	Consideration for Enrichment	Characteristics of Effective Enrichment/ examples
<p>MEAT PIGS</p> <p>BOARS and</p> <p>GILTS (young breeding sows)</p>	<p>Motivation to address:</p> <ul style="list-style-type: none"> ▪ To explore their environment, ▪ To forage, search for food (nosing, rooting and chewing). <p>Welfare Risks:</p> <p>If pigs cannot perform these behaviours, they can get frustrated, expressed as undesirable pig-pig manipulation behaviours such as tail and ear biting. Pigs are strong and can quickly destroy materials, with a risk of injury to themselves and others.</p>	<p>Offer: To enable exploration and foraging - substrates (particulate, natural materials) and materials that allow investigation, manipulation and are chewable (deformable, destructible), edible (with an interesting texture, flavour, or smell) and allow ingestion.</p> <p>Examples of optimal enrichment: Straw or hay, ideally as big bales or loose material. Objects which offer multi-dimensional benefits e.g. straw bales which allow pigs to root and hide are ideal.</p> <p>When offering the above is not possible, enrichment materials provided in a rack or dispenser, preferably loose or less preferably, in compressed forms.</p> <p>Avoid (inappropriate enrichment): Chains, tyres, plastic tubes, simple plastic toys, hardwood beams, loose canisters as these do not meet animals' motivational needs.</p>
<p>GESTATING SOWS (pregnant)</p>	<p>Motivation to address:</p> <ul style="list-style-type: none"> • To forage, search for food (nosing, rooting and chewing), as they are fed a restricted quantity of food (i.e., less than their desired ad libitum intake), • To explore their environment (especially if their food needs are met). <p>Welfare Risks: If needs are not met, risk of stereotypic* behaviours (sham chewing, jaw stretching) and undesirable pig manipulation (vulva biting, aggression).</p>	<p>Offer:</p> <p>To enable foraging (and exploration) - substrates (particulate, natural materials) that are chewable and edible (with an interesting texture, flavour, or smell), that allow ingestion and with some nutritional value and gut fill; substrates that allow investigation and are chewable (deformable, destructible).</p> <p>Examples of optimal enrichment: straw or hay, ideally as bales or loose material. When offering the above is not possible, enrichment materials provided in a rack or dispenser, preferably loose or less preferably, in compressed forms.</p> <p>Avoid (inappropriate enrichment): See above.</p>
<p>NURSING SOWS (with litter)</p>	<p>Motivation to address:</p> <ul style="list-style-type: none"> • To perform nest-building behaviour. <p>Welfare Risks:</p> <p>If needs are not met, there is a risk of longer farrowing duration resulting in lower piglet survival rate. Frustration regarding limited space and lack of substrate can lead to aggression and stereotypic* behaviour.</p>	<p>Offer (optimal enrichment): Nest-building materials - substrates (particulate, natural materials), ideally provided as loose material on the floor (optimal enrichment), but if this is not possible, provided in a rack or dispenser, loose.</p> <p>Sub-optimal enrichment: When the above is not possible, as a minimum: hessian or cloth sacks or ropes, accessible within the farrowing crate or pen and offered near the head of the sow (if movement is restricted)</p> <p>Avoid (inappropriate enrichment): See above. Paper bedding as nesting material as it can be unsafe for piglets</p>
<p>Piglets (before and after weaning)</p>	<p>Motivation to address:</p>	<p>Offer: To enable exploration and play - substrates (particulate, natural materials) that allow investigation, manipulation and are chewable</p>

	<ul style="list-style-type: none"> • To explore novel aspects of their environment, • To learn (social) skills through play, • To hide from others. <p>Other considerations: Extra attention should be paid to biosecurity in selecting and managing enrichment.</p>	<p>(deformable, destructible), edible (with an interesting texture, flavour, or smell) and allow ingestion.</p> <p>Examples of optimal enrichment: straw or hay, ideally as bales or loose material. When offering the above is not possible, materials provided in a rack or dispenser, preferably loose, or less preferably, in compressed forms.</p> <p>Sub-optimal enrichment: When the above is not possible, as a minimum, hessian or cloth sacks or ropes, novel substrates (particulate, natural materials) to play with, shelter or panels to hide in or behind. Enrichment needs to be adjusted to the size of the piglets and allow multiple piglets to use it (similar to synchronized suckling bouts).</p> <p>Avoid (inappropriate enrichment): Materials which may cause entanglement of piglets.</p>
--	--	--

Table 2 : Enrichment Examples for Each Stage of Production.

**Examples only: Many additional enrichments are possible. Be sure to consider animal safety, food safety, environmental hazards and biosecurity when selecting enrichments. Consult your veterinarian for additional ideas.*

Stage of Production (Housing system)	Enrichment examples* (Category)	
Gestating sows (Stalls)	<ul style="list-style-type: none"> » Visual and/or physical contact with other sows (Social), » Chain, wood on a chain, rubber stall mat, periodic exercise (Occupational/Physical), » Radio, brushing (Sensory), » Multiple feeds, top dressing feeds e.g. silage, chopped straw, hay cubes (Nutritional). 	
Gestating sows (Group housing)	<ul style="list-style-type: none"> » Contact with other sows (Social), » Pen walking, wood on a chain, wood in a holder, cotton rope, chain, PVC pipe, substrates such as straw, peat moss, shavings (Occupational), » Solid flooring for lying, pen partitions, rubber mats (Physical), » Radio, brushing (Sensory), » Multiple feeds, top dressing feeds e.g. silage, chopped straw, hay cubes (Nutritional). 	

Stage of Production (Housing system)	Enrichment examples* (Category)	Stage of Production (Housing system)
Farrowing sows (Farrowing crates)	<ul style="list-style-type: none"> » Visual or physical contact with piglets or sows (Social), » Chain, wood on a chain, rubber stall mat (Occupational/Physical), » Radio (Sensory), » Multiple feeds, top dressing feeds (Nutritional). 	
Piglets (Farrowing pens)	<ul style="list-style-type: none"> » Contact with sow and piglets (Social), » Ropes, dog toys, peat moss (Occupational), » Rubber mats, water bowl, hover (Physical), » Sow presence, radio (Sensory), » Creep feed (dry or mash), milk replacer (Nutritional). 	
Nursery/Weaned pigs (Group pens)	<ul style="list-style-type: none"> » Contact with sow and piglets (Social), » Ropes, dog toys, peat moss (Occupational), » Rubber mats (Physical),» Radio (Sensory), » Pen Walking (social), » Mash, top dressing feeds, milk replacer (Nutritional). 	
Grow / Finish pigs (Group pens)	<ul style="list-style-type: none"> » Contact with other pigs (Social), » Pen walking, wood on a chain, wood in a holder, cotton rope, chain, PVC pipe, substrates such as straw, peat moss, shavings (Occupational), » Solid flooring for lying, pen partitions, rubber mats (Physical), » Radio (Sensory), » Multiple feeds (e.g. liquid feeding systems), top dressing feeds e.g. silage, chopped straw, hay cubes (Nutritional). 	
Boars (Stalls or pens)	<ul style="list-style-type: none"> » Visual and/or physical contact with sows or compatible boars (Social), » Chain, wood on a chain, Kong toy or similar durable object, rubber mat, periodic exercise (Occupational/Physical), » Radio, brushing (Sensory), 	

Adapted from: From CPC

5. REFERENCES

Canadian Pork Council. (2018). *CPE PigSAFE/PigCARE Producer Manual*. Section 7.5: Enrichment. Retrieved July 10, 2024, from <https://www.cpc-ccp.com/resources/on-farm-programs>.

European Commission. (2016). Commission Recommendation (EU) 2016/336 of 8 March 2016 on the application of Council Directive 2008/120/EC laying down minimum standards for the protection of pigs as regards measures to reduce the need for tail-docking. *Official Journal of the European Union*. Retrieved July 11, 2024, from <https://eur-lex.europa.eu/eli/reco/2016/336/oj>

National Center for Biotechnology Information. (2019). *PMC6325398*. Retrieved July 11, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6325398/>

National Farm Animal Care Council. *Code of Practice for the Care and Handling of Pigs*. Section 1: Housing and Handling Facilities. Retrieved July 11, 2024, from https://www.cpc-ccp.com/uploads/userfiles/files/pig_code_of_practice.pdf

RSPCA Australia. (n.d.). Why is environmental enrichment important for pig welfare? Retrieved July 11, 2024, from <https://kb.rspca.org.au/knowledge-base/why-is-environmental-enrichment-important-for-pig-welfare/>

Van de Weerd, H., & Ison, S. (2019). Providing Effective Environmental Enrichment to Pigs: How Far Have We Come? *Animals*, 9(5), 254. <https://doi.org/10.3390/ani9050254>

Document Status and Revision History

DATE	NEW VERSION
9-July-2024	Version 1 (New)