



ENVIRONMENTAL ENRICHMENT FOR PIGS: WHAT, WHY AND HOW?

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WHAT?



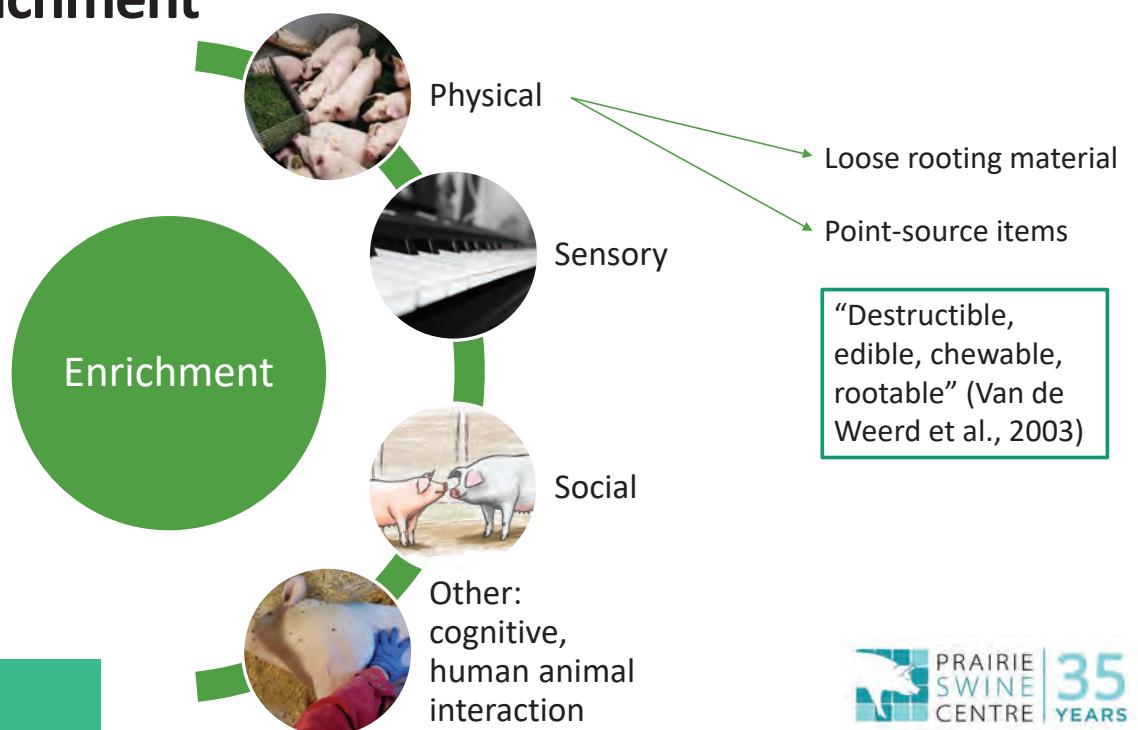


What is enrichment?

- “Husbandry principle that seeks to enhance the quality of captive animal care by identifying and providing the environmental stimuli necessary for **optimal psychological and physiological wellbeing**”. (Newberry, 1995)
- “**Promote species-typical behaviours** that help animals adapt to their living environment and improve their welfare.” (Chou et al., 2024)



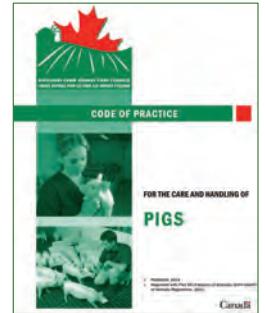
Types of enrichment





Pig Code of Practice

- Enrichment = A way of changing the environment of pigs to their benefit
- “Pigs must be provided with multiple forms of enrichment that aim to improve the welfare of the animals through the enhancement of their physical and social environments.”
- Goals: promote normal behaviours, reduce abnormal behaviours, increase positive use of the environment and help cope with stress



WHY?



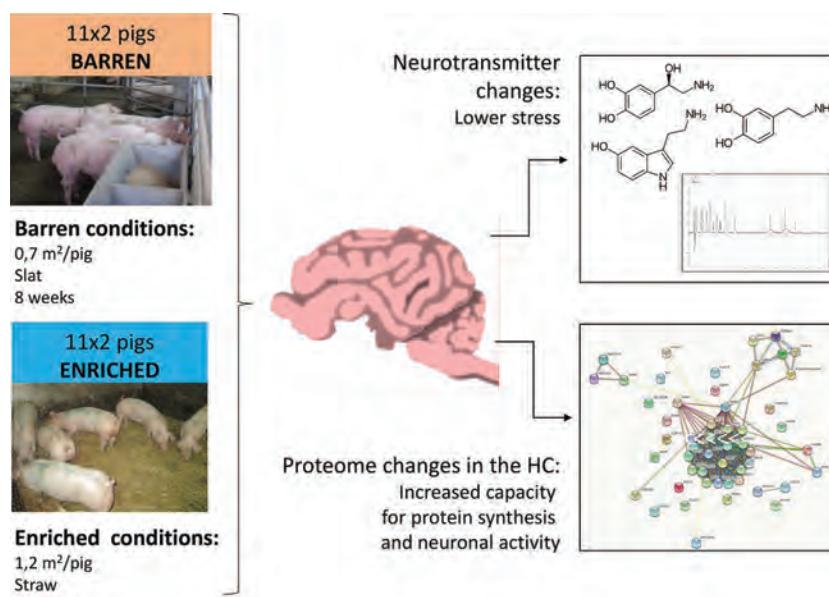


Benefits of enrichment

- Facilitate species-typical behaviours
 - Nest-building, rooting and foraging
- Reduce severity or frequency of abnormal/damaging behaviours
- Help animals cope with stressful events such as weaning, mixing
- Enhance disease resilience
- Improve growth performance & reproductive performance
 - Smooth farrowing, less stillborn, less crushing



Neurobiological benefits of enrichment

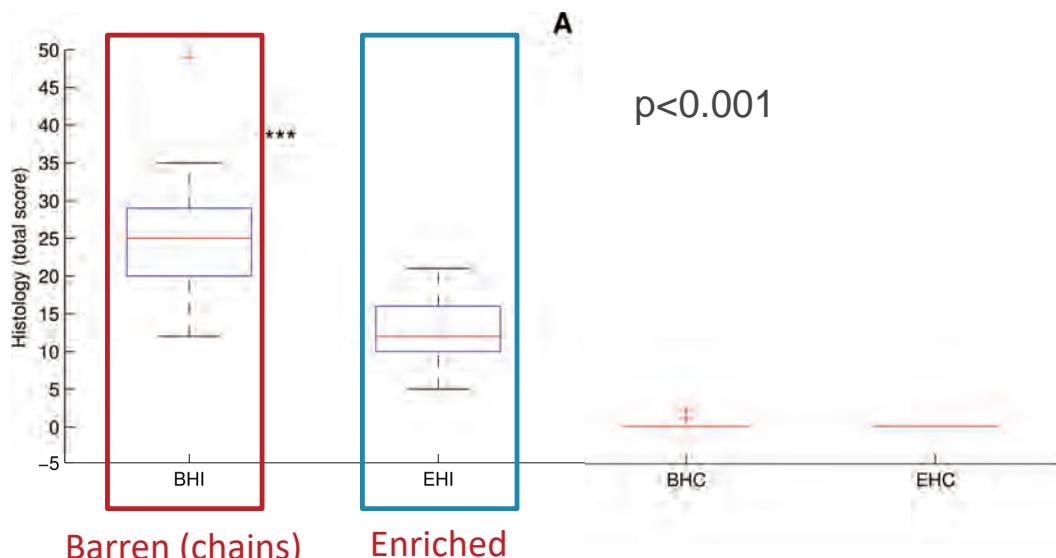


From Arroyo et al., 2020
Journal of proteomics 229 (2020): 103943
<https://doi.org/10.1016/j.jprot.2020.103943>





Postmortem lung lesion after PRRS infection



Van Dixhoorn et al., 2016

PloS one 11.9 (2016): e0161832

<https://doi.org/10.1371/journal.pone.0161832>



Improved pre-weaning performance

- Fewer stillborn piglets (1 kg lucerne hay daily) (Edwards et al, 2019)
- Lower pre-weaned piglet mortality and higher colostrum intake (2kg of chopped straw in a rack) (Plush et al., 2021)





Barriers to enrichment provision

- Cost and labour
- Flooring system
- Biosecurity, hygiene, safety
- Necessity and willingness to invest (Engele, 2024)
- Not sure what is practical to use
 - Knowledge gap between research and practicality



Drivers for enrichment provision

- Legislation or code of practice requirement
- Assurance schemes
- Stressful events – mixing
- Public perception
- Tail biting
 - EU: Tail docking banned as routine practice (Council Directive 2008/120/EC)
 - Pig tail as a commodity





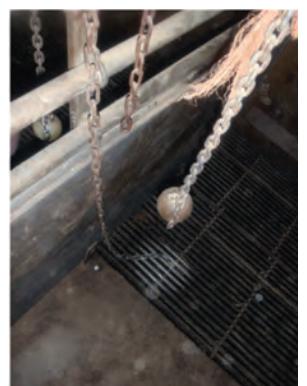
HOW?



Chain as environmental enrichment

- Frequently used on farms (e.g., 41.4% of Irish farms; van Staaveren et al., 2019)
 - Tail/ear biting ↑ in farms using chains (c.f. plastic toys & wood)
- Research on effects: chain = barren
 - Day et al. (2002): growth, behaviour, ease of handling, fearfulness, carcass muscle pH
 - Smith and Pierdon (2024): behaviour, skin lesion on most days (USA wean-to-finish commercial barn)

"Destructible, edible, malleable, rootable" (van de Weerd et al., 2003)





Boars

- Isolated, confined, barren
- Pair housing of siblings
- Prefer ropes (Sirovica et al., 2019)



←Image from Sirovica et al. (2019) *Preference for and behavioural response to environmental enrichment in a small population of sexually mature, commercial boars.*
<https://doi.org/10.7120/109627286.28.3.271>



Gestating sows

- Hunger: stereotypies, aggression
- Ontario 200-sow commercial farrow-to-finish barn
 - Family-owned and run
 - Small group pen <10 sows
 - Floor feeding, functional area
 - Solid floor with straw provision
 - Weekly clean-out





- 2000-sow, commercial Irish farrow-to-finish barn (N=120)
- Benefits of improved housing:
 - Sows: stereotypic behaviour ↓, inflammation ↓, locomotion ↑, mummies ↓
 - Offspring: scour ↓, vitality ↑



vs.

← Images courtesy of Martyna Lagoda *Lagoda et al. (2023)*
Indicators of improved gestation housing of sows. Part I: Effects on behaviour, skin lesions, locomotion, and tear staining & Part II: Effects on physiological measures, reproductive performance and health of the offspring.
<https://doi.org/10.1017/awf.2023.47>
<https://doi.org/10.1017/awf.2023.48>



Farrowing sows

- Nesting behaviour: postural changes ↓, birth intervals ↓, stillborn ↓ and pre-weaning mortality ↓
- Sawdust: 288 sows, large commercial Australian farm (Cronin et al., 1993)
 - 1L sawdust before farrowing & every 30-60mins 1-2 handful
 - Farrowing duration ↓, crushing in first 6h ↓
- Burlap: 626 sows, 1500-sow farrow-to-finish, Manitoba (Fynn et al. 2021)
 - Stillborn ↓

→ Image from Fynn et al. (2021) *Pre-farrow enrichment with burlap sheet: potential benefit for sow performance.*
<https://doi.org/10.1139/cjas-2021-0027>





Positive human contact

- Reduced fear for human: 360 gestating sows, large commercial Australian farm (Hayes et al., 2021)
 - Pat, stroke, scratch and talk softly 2 mins/pen daily
- Reduced pre-weaning mortality: 1014 farrowing sows, commercial Belgium farm (Meyer et al., 2020)
 - 15s back scratch/sow from entry until farrowing (~1 week)
 - 80's music played from a radio (6AM – 6PM)

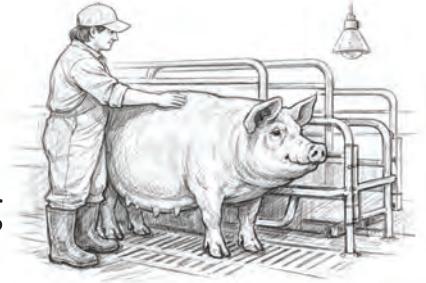


Image created by ChatGPT5.0



Suckling piglets

- Mixing aggression
- 661 piglets, commercial Spanish farm (Ko et al., 2020)
 - 2 hemp ropes, 4 rubber/plastic chew toys
 - Pre-weaning socialisation of 2 litters from D14 to weaning
 - Mixing lesions after weaning, stress hormones ✓ (cortisol →, chromogranin A →, α-amylase ↓)
 - Front carcass lesions ↓



Photo credit: Marianne Farish
(adapted by ChatGPT 5.0)





Nutritional enrichment – creep feeding

- Beneficial to piglet growth and gut development
- Creep preference: large pellets
- Play feeder: attract more piglets to the feeder, improve post-weaning feed intake and growth, lower risks of diarrhoea and body lesions (Middelkoop et al., 2021)



Funded by the Agriculture Demonstration of Practices and Technologies (ADOPT)



Grow-finishing pigs

- Tail biting (TB)

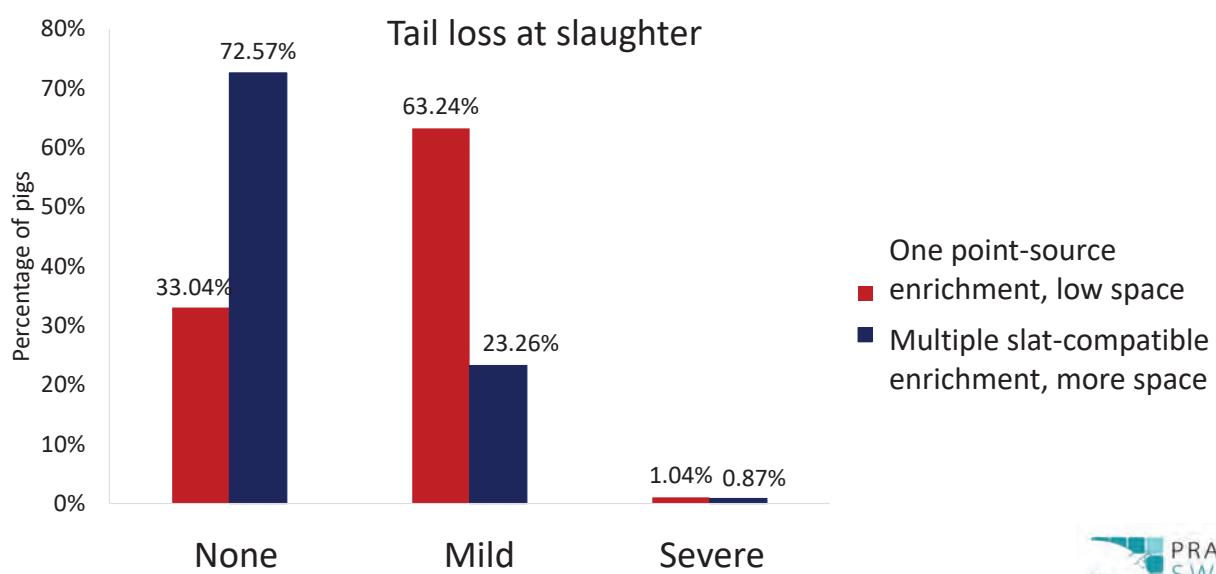




Effective enrichment on fully slatted system

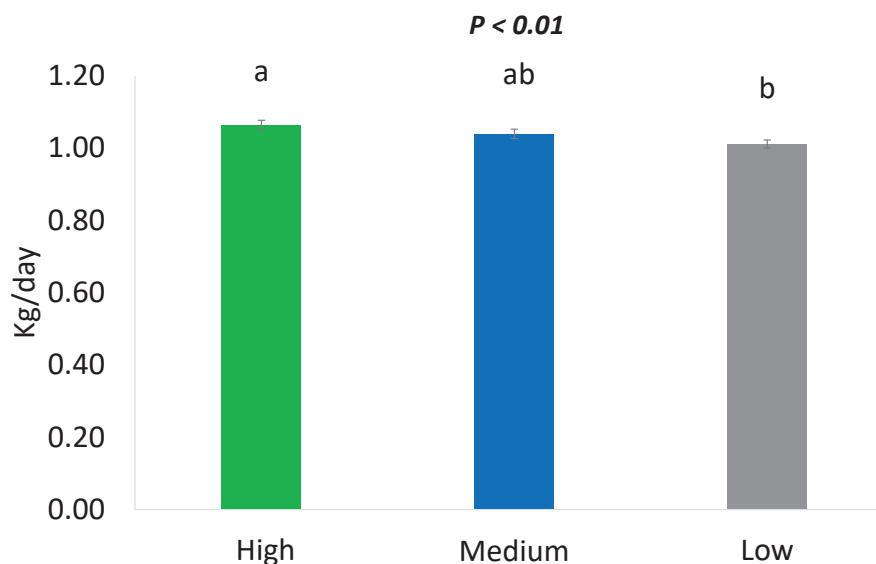


Manage TB in pigs in fully slatted systems





Improved Finisher ADG



Same enrichment, different labour input:

High: *Daily*; daily large quantity of rooting materials

Medium: *2d change*; daily low quantity of rooting materials

Low: *weekly change*; 3d/wk low quantity of rooting materials

Chou et al., 2020

<https://doi.org/10.3389/fvets.2020.584706>



Economic modelling: undocked enriched vs docked barren

Modelling farm: 775 sow, farrow-to-finish; 26.5 pigs per sow/year produced

	Undocked enriched	Docked barren
Weaning weight (kg)	7.09	7.00
Transferring weight (kg)	36.94	32.76
Slaughter weight (kg)	110.94	103.4
No. weeks taken to slaughter	20.85	20.14
Kill out percentage (%)	74.51	73.60
Enrichment cost (€/pig/production cycle)	1.93	0.10
Net margin / pig (€)	9.25	4.88





Other enrichment that works

- Undamaged tails/ears ↑, mild tail lesions ↓: 780 pigs, commercial Finnish barn, 11 pigs/pen (Telkänranta et al., 2014)

- 1 straw rack, 1 metal chain, daily wood shavings, fresh birch (undocked pigs)



- TB outbreak intervention: 1987 undocked pigs, commercial Danish farm, 30 pigs/pen

- 7g/pig/day chopped straw ✓ > rope > toy

- Severe tail damage ↓: 880 pigs, 1100-sow commercial Brazilian barn

- Branched chains + sisal ropes (1:12 ratio)



Periodic enrichment

- Newsprint with Phytozen®, Mon/Wed/Fri, 6-8 pieces
 - Reduced front/mid/hind/ear lesion in late life
 - Higher weight gain when providing in late life



Research officer
Abby Tillotson



Saskatchewan Ministry of Agriculture, ADF programme





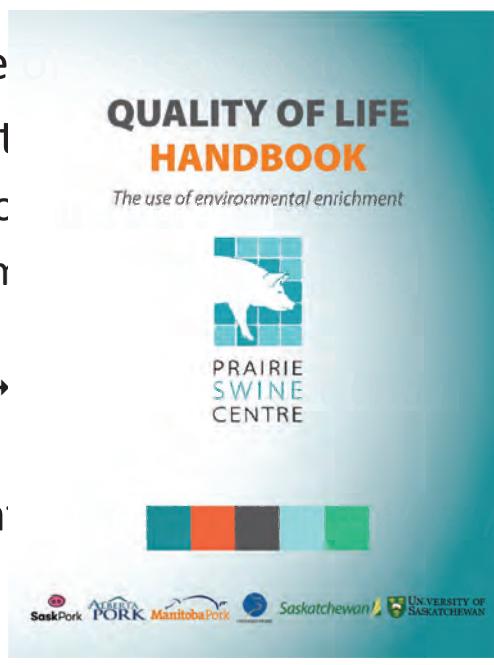
Commercial barn application

- Large scale integrator: 1200-sow farrow-to-finish farm
 - Renewable: enrichment interaction ↑, tail/ear manipulation ↓
- PSC barn: 300-sow farrow-to-finish farm
 - Static: enrichment interaction ↑, skin lesions ↓



Summary – how to implement proper enrichment?

- What's the purpose
- Physical enrichment
 - Any form of loose, rc
 - Point-source enrichn
 - Destructible better
 - Optimal quantity? →
 - Context dependent
- Positive human con
- Housing (boars)



pair



PRAIRIE
SWINE
CENTRE

35
YEARS



Producer testimonial

- 1000-sow Irish farrow-to-finish

Video source: Shane McAuliffe



Shane's LinkedIn



Take-home messages

- Effective: what is the goal?
- Start from small steps
 - Solid floor: handful sawdust/substrates
 - Slats: destructible burlap, rope, commercial chew toys, soft wood
- Incorporate in daily routine
- Satisfy animals' behavioural needs

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