



# ENVIRONMENTAL ENRICHMENT FOR PIGS: WHAT, WHY AND HOW?

---

Dr. Jen-Yun Chou, PhD, MSc, MA  
Research Scientist, Ethology & Welfare  
Prairie Swine Centre  
[Jenyun.chou@usask.ca](mailto:Jenyun.chou@usask.ca)

Jan 7-8, 2026, Banff Pork Seminar



## WHAT?

---



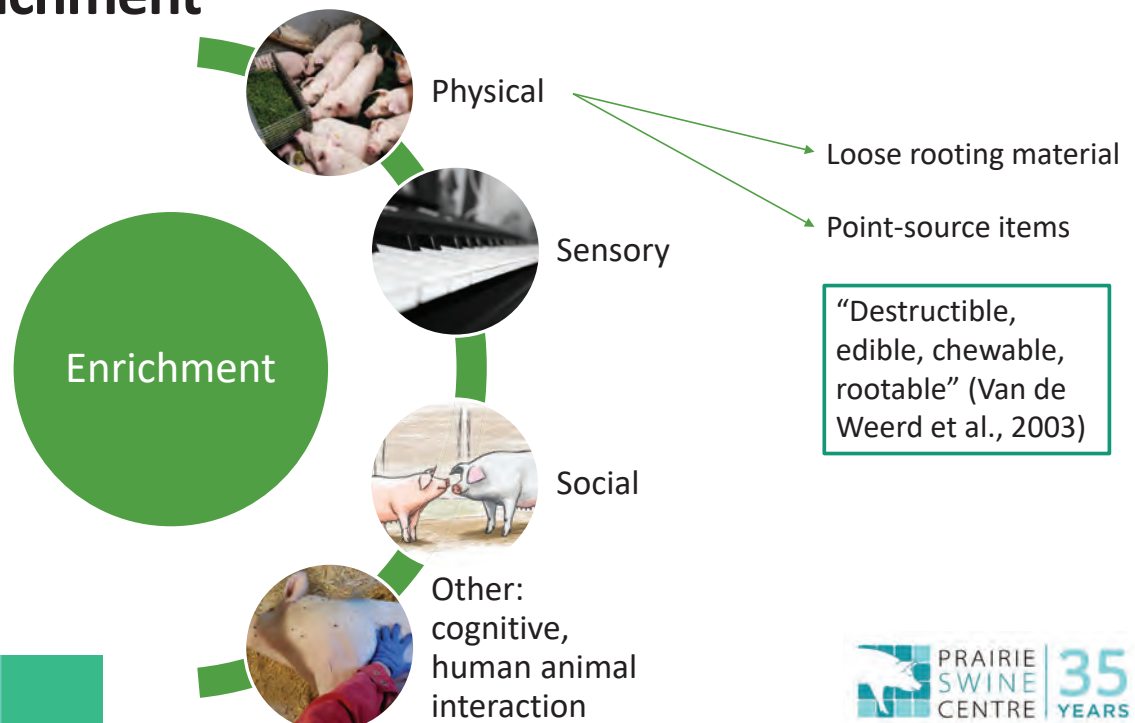


# What is enrichment?

- “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?

---



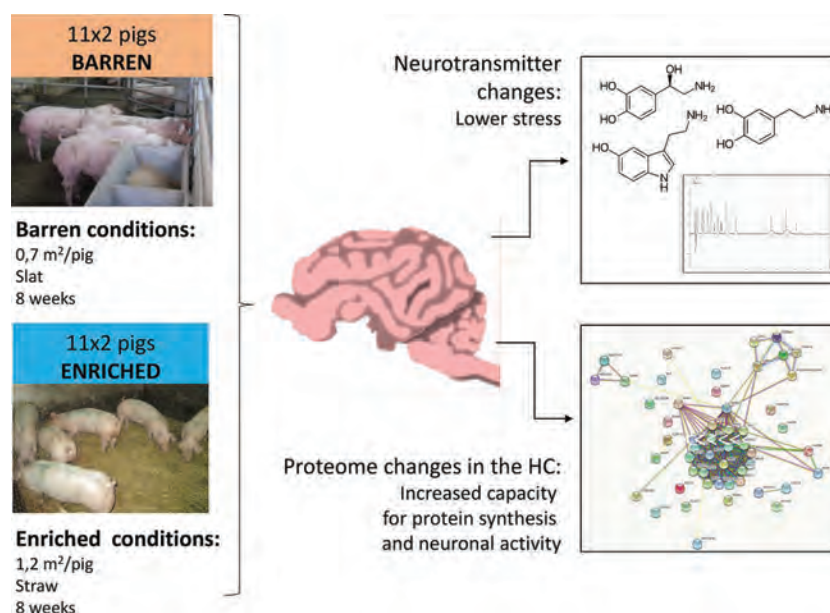


## Benefits of enrichment

- 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

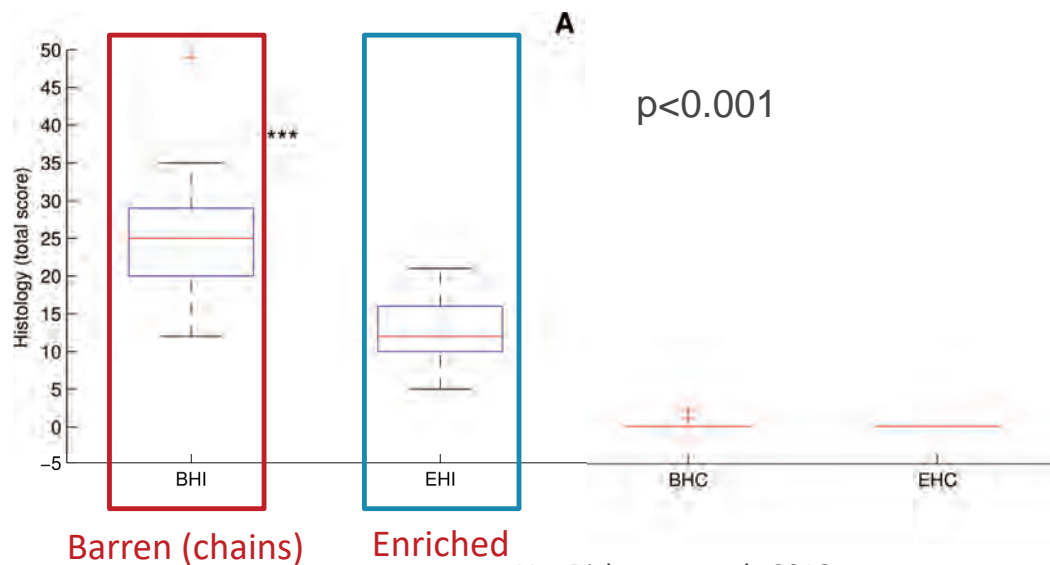


From Arroyo et al., 2020  
Journal of proteomics 229 (2020): 103943  
<https://doi.org/10.1016/j.jprot.2020.103943>





## 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?

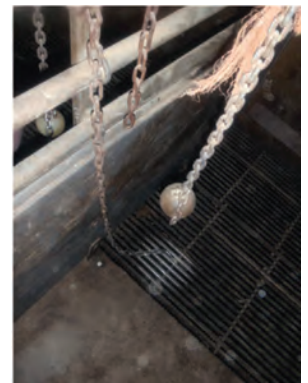
---



## 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, ~~usable~~,  
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 →,  $\alpha$ -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)

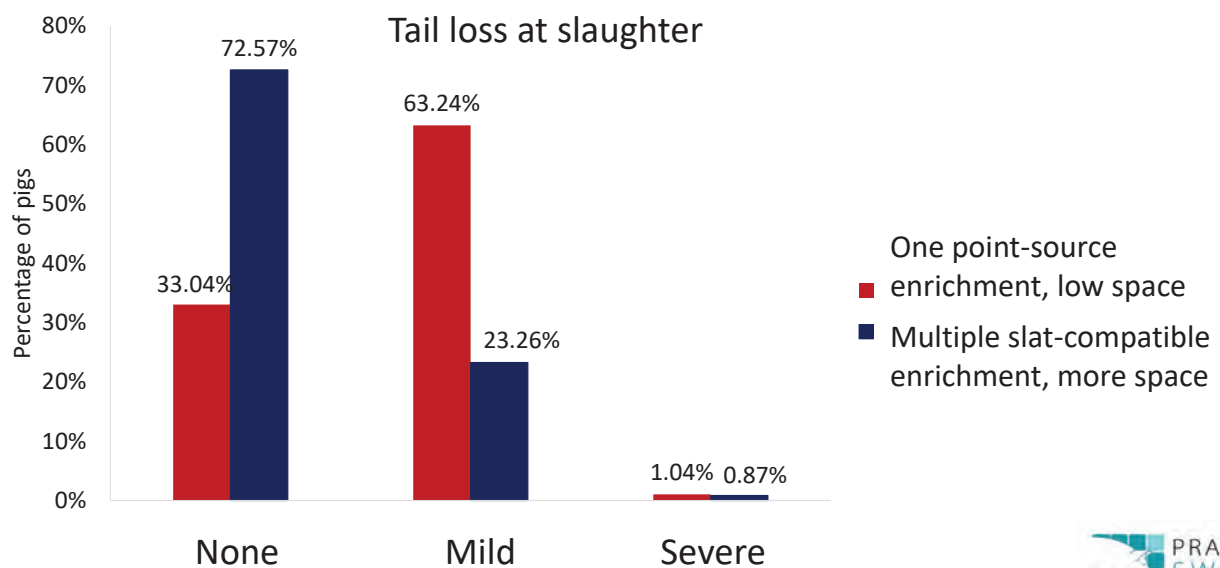




## Effective enrichment on fully slatted system

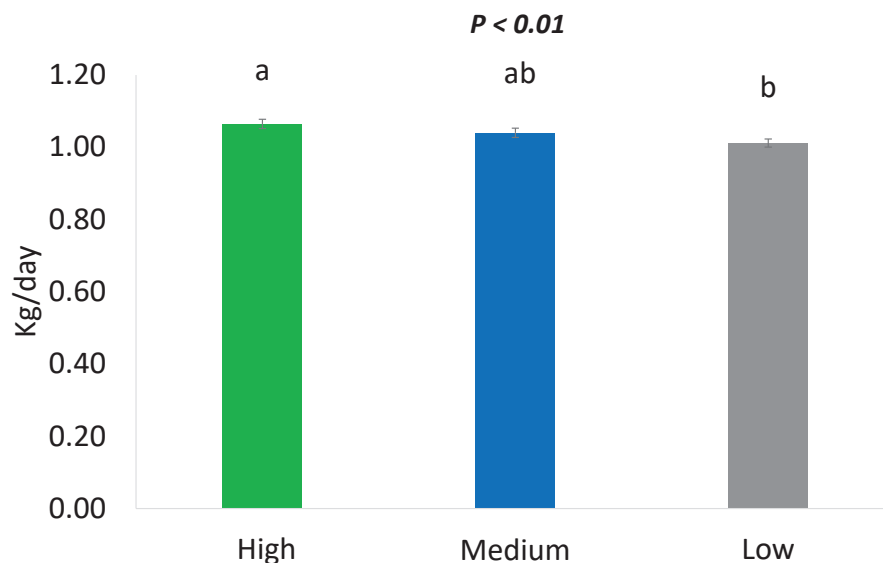


## Manage TB in pigs in fully slatted systems





## 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







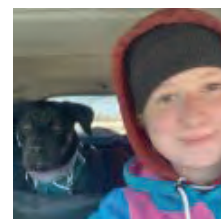
## Other enrichment that works

- 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<sup>®</sup>, 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





## 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 ↓

Nursery

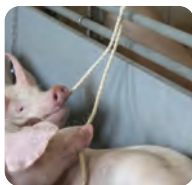


Photo:  
<https://www.msschippers.com/en-EU/product/8800077/rope-small-loop-sisal-320-cm>

Renewable

Static

Renewable

Static

<https://easyfix.com/product/astro-200/>

<https://www.ketchummfg.com/porkyplay>

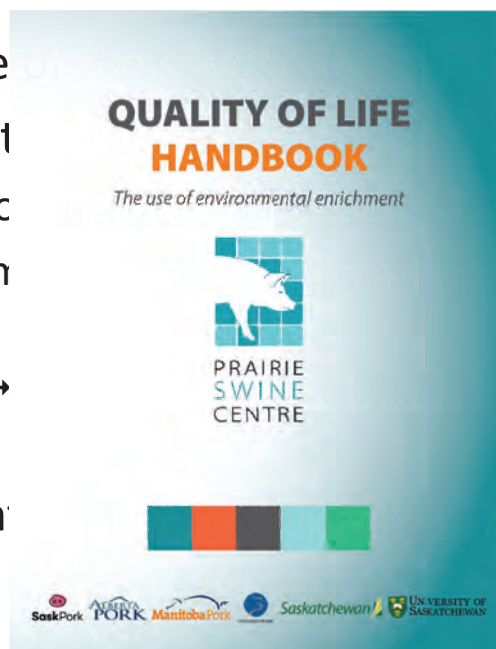


Ministry of Agriculture, ADOPT programme



## 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)



ctive



pair





## 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

Special acknowledgement:  
BPS organising committee, Ashley Steeple  
Martyna Lagoda, Yolande Seddon and COP SC  
Miranda Smit & Abby Tillotson

