Improving pig welfare in commercial systems

Keelin O'Driscoll

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Agriculture and Food Development Authority

Challenges facing animal agriculture

- Push to increase output, yet become more sustainable
  - ↓ environmental damage, ↑ food production, while maintaining animal and human health and welfare
  - Policy shifting towards encouraging organic systems, agro-ecology etc.

- Public concern re animal welfare increasing
  - Awareness growing of typical practices via the actions of NGO's
  - End the cage age European Citizens Initiative
  - Not addressing public's concerns about the welfare of the animals, may result in social licence being lost

Public perception

Main responsibilities of farmers are considered to be:

Pigs	• Living conditions • Intensiveness • Sentience of the animal • Lack of visibility/transparency	High

Two main objectives when considering pig welfare

1. Compliance with current legislation
   - Council Directive 2008/120/EC
2. Aiming to go beyond what should be the status quo

Eurobarometer, 2020; Sweeny et al., 2022

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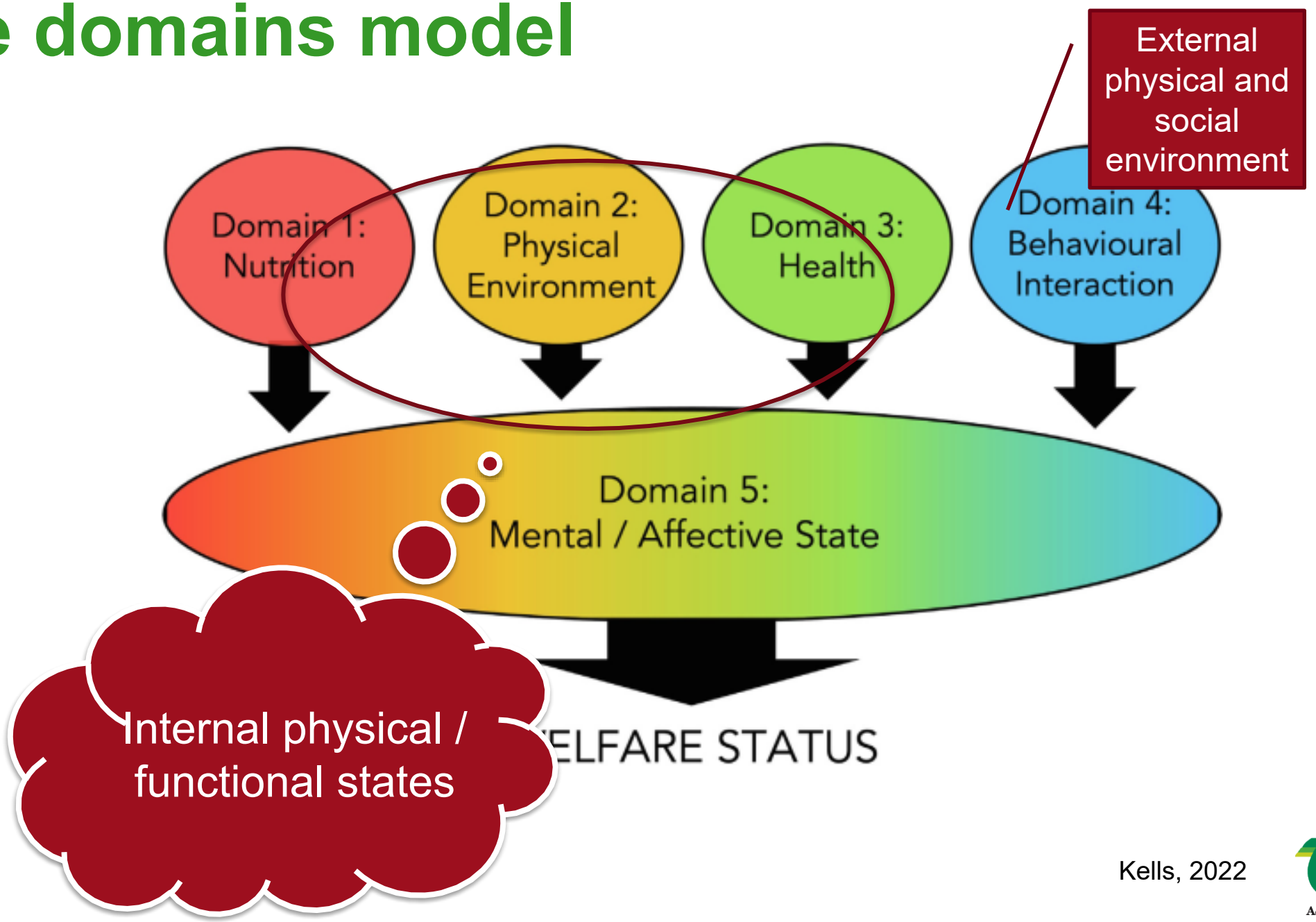
Research approach

- A characteristic of an individual animal
- Related to the effects of genotype and environment on the individual animals ability to cope
  - First strategy used to cope – change to behaviour
  - Failure to cope: stress, disease, injury, death
- Historically animal welfare research has focused on aiming to reduce negative welfare states
  - The ‘5 freedoms’ widely used to structure teaching, in policy documents etc.

Five domains model



Kells, 2022

Understanding the domains

- Domains 1- 3: Welfare compromise, negative affective states
  - Aim from a welfare perspective is to minimise extreme or prolonged exposure
    - Optimisation = a neutral welfare state at best

- Domain 4 - ‘Agency’ is critical
  - Engage in voluntary, goal-directed behaviours (Spinka, 2019)
  - Do animals have agency in deciding when/whether to perform highly motivated species-specific behaviours (rooting, maternal, play etc.)?

Kells, 2022

Towards a life worth living

- Satisfying Domains 1-3 + optimising Domain 4 ➡ Positive welfare
  - Stimulus-rich environments (social or environmental), that match animals physical and behavioural needs, can allow this
- Domain 5 is not functionally separate from other Domains
  - Conditions in Domains 1–4 used to infer mental state

Good welfare requires positive experiences in addition to the alleviation of negatives

Kells, 2022

The natural behaviour of pigs

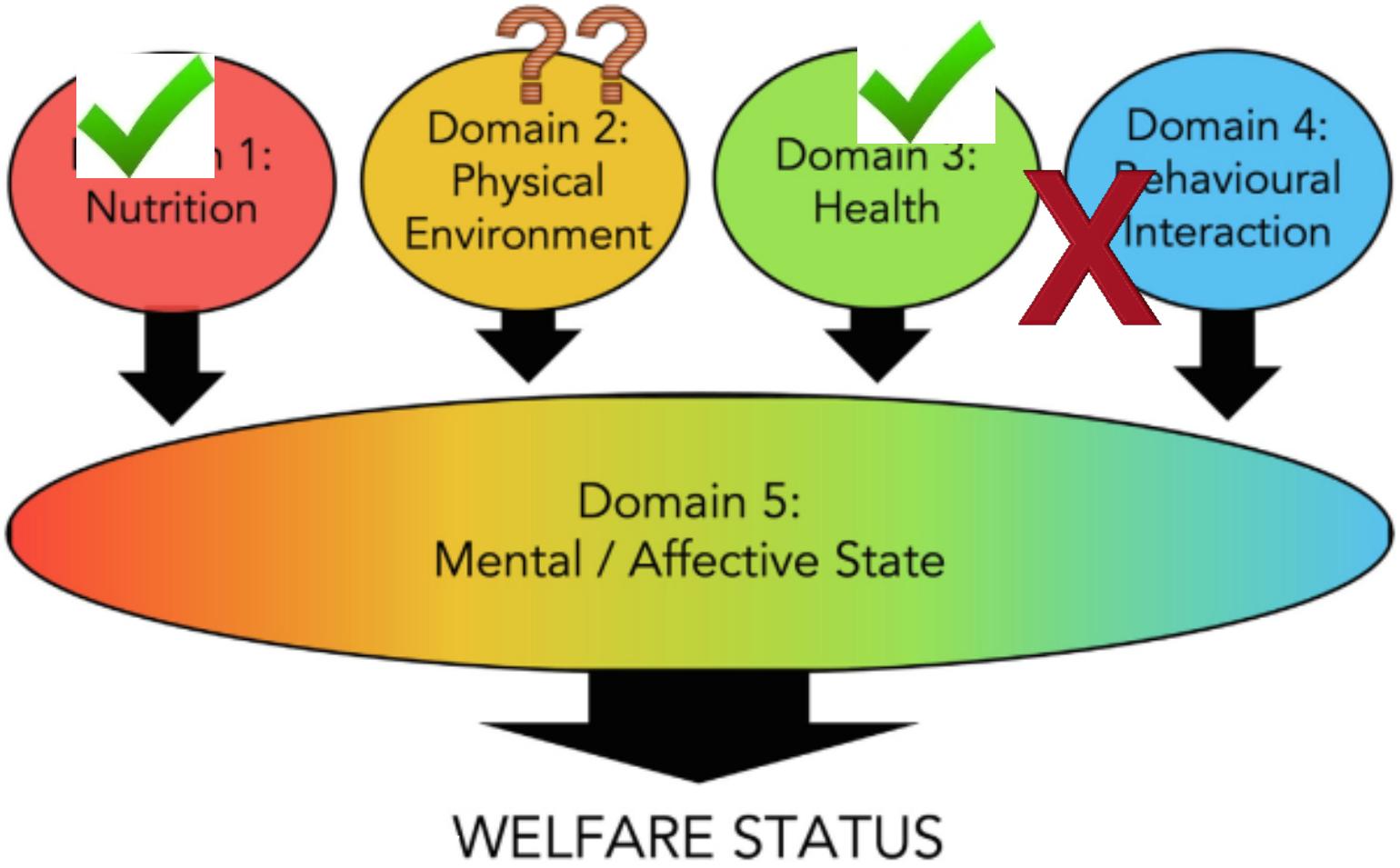
- Small family groups (sounders), matriarchal
- Habitat generally includes heavy brush
- Several 100 to > 1000 ha (Jánoska et al., 2018)
- Opportunistic omnivores
  - 52% of behaviour associated w foraging
    - 40% of this was rooting w snout + forelegs
  - 23% of behaviour was exploration (locomotion, nosing, manipulation)

Newbury and Wood-Gush, 1984; Stolba and Wood-Gush, 1989

Commercial pig husbandry

- Family structure non-existant
  - Groups defined by management decisions
- Confined to pens with a relatively low space allowance
- Barren environment
- High spec diets to optimize growth
  - Limited foraging opportunities

In commercial pig farms



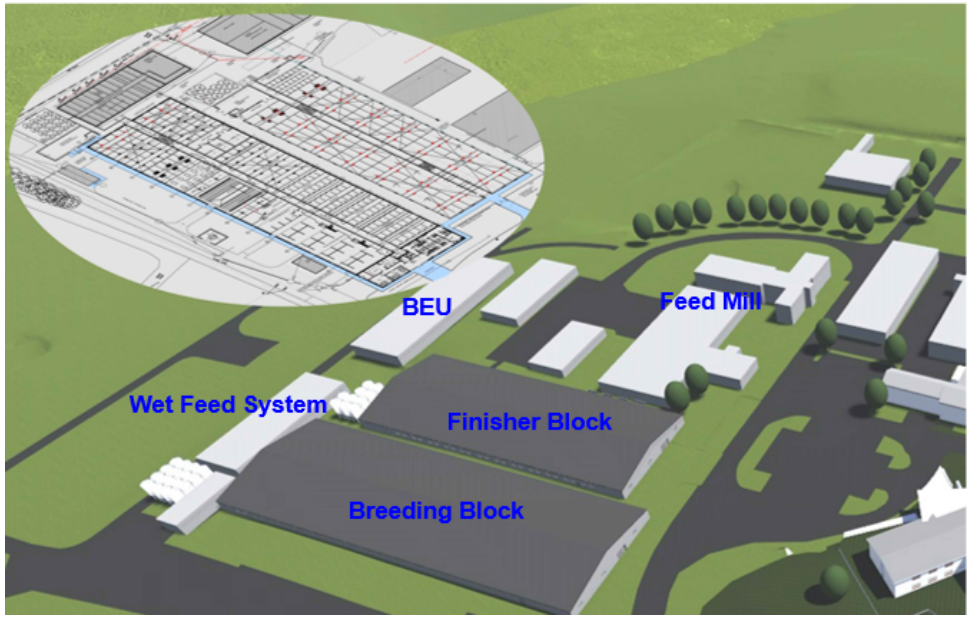
Kells, 2022

The Irish pig sector

- Pork considered a low value, commodity product
  - 50% exported (UK, China)
- Farm size ~ 500 sows, farrow-to-finish, internal replacement
- 40% home milling (↓ cost), 60% wet feed (historically used by-products)
- Veterinarian income linked to sales
- Almost all units fully slatted (90% of pens; D'Alessio et al)
- Widespread docking of tails (> 98%)

Case study – Teagasc pig unit

- Newly opened in 2016, designed to match typical industry standards
- 14 pigs / pen at legal stocking density
- Fully slatted, with single spaced feeders
- Only concession to improving welfare
  - Overflow of 7 ‘loose lactation’ pens
- No expectation to provide loose material in any section of the unit



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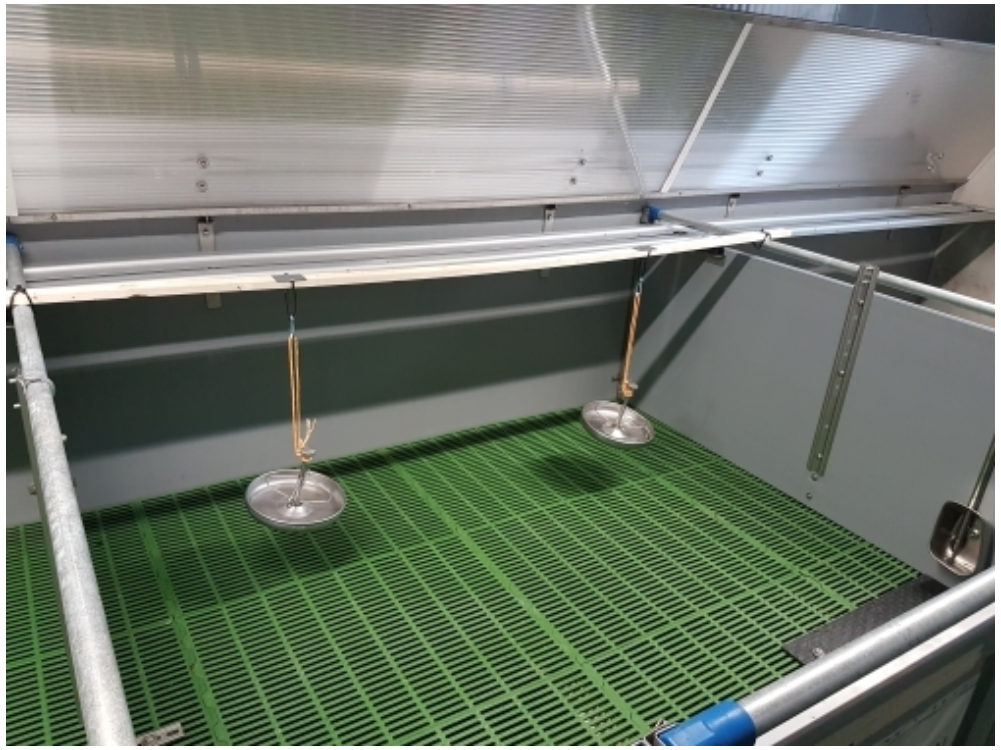
Case study – Teagasc pig unit



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An iceberg indicator of welfare

- A single indicator that ‘captures’ or summarises a number of welfare consequences/issues
  - Correlated with multiple animal based indicators
  - Should be quick, easy to use, inexpensive, accurate, easily visible
- Relevant across different production systems + environments

An intact tail

» Assumption that shortening is due to docking or biting

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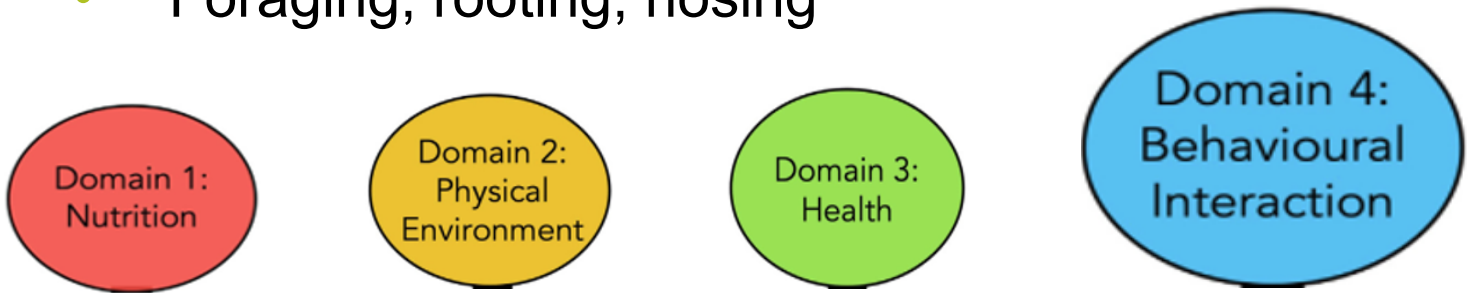
Tail biting

- An abn aviou
  - Assoc ts and
- Genera
  - Rare i
- Tail do it in c
  - > 98%

Working within the constraints of our system

- Step 1: Could improving enrichment reduce the need to dock?
- Items that permit animals to perform species specific behaviour and are biologically relevant
  - NOT a luxury item
  - Should be considered an essential part of husbandry, to promote mental well being
- Highly motivated behaviours in pigs
  - Foraging, rooting, nosing

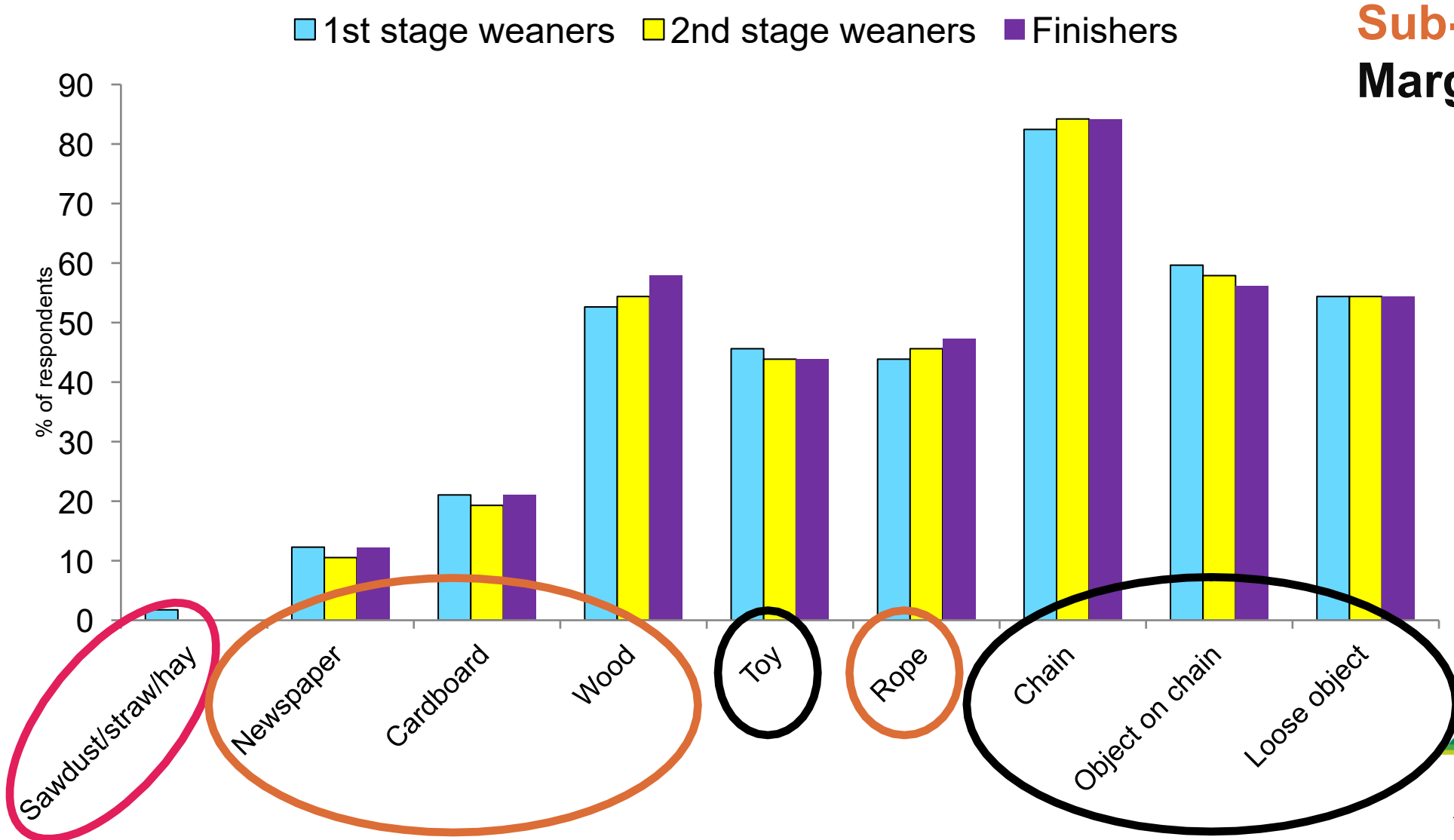


EU Categorisation

- Optimal
  - Can be used alone because they possess all the characteristics to meet pigs' needs
  - Straw, green fodder, miscanthus etc.
- Sub-optimal
  - Can be used as an essential component of the pig's enrichment but should be used in combination with other materials
  - Fresh wood, compressed straw, natural ropes, hessian cloth
- Marginal
  - Should not be used as essential or single component of pig enrichment materials
  - Hard plastic piping or chains

Enrichment in use in 2015

Optimal
Sub-optimal
Marginal



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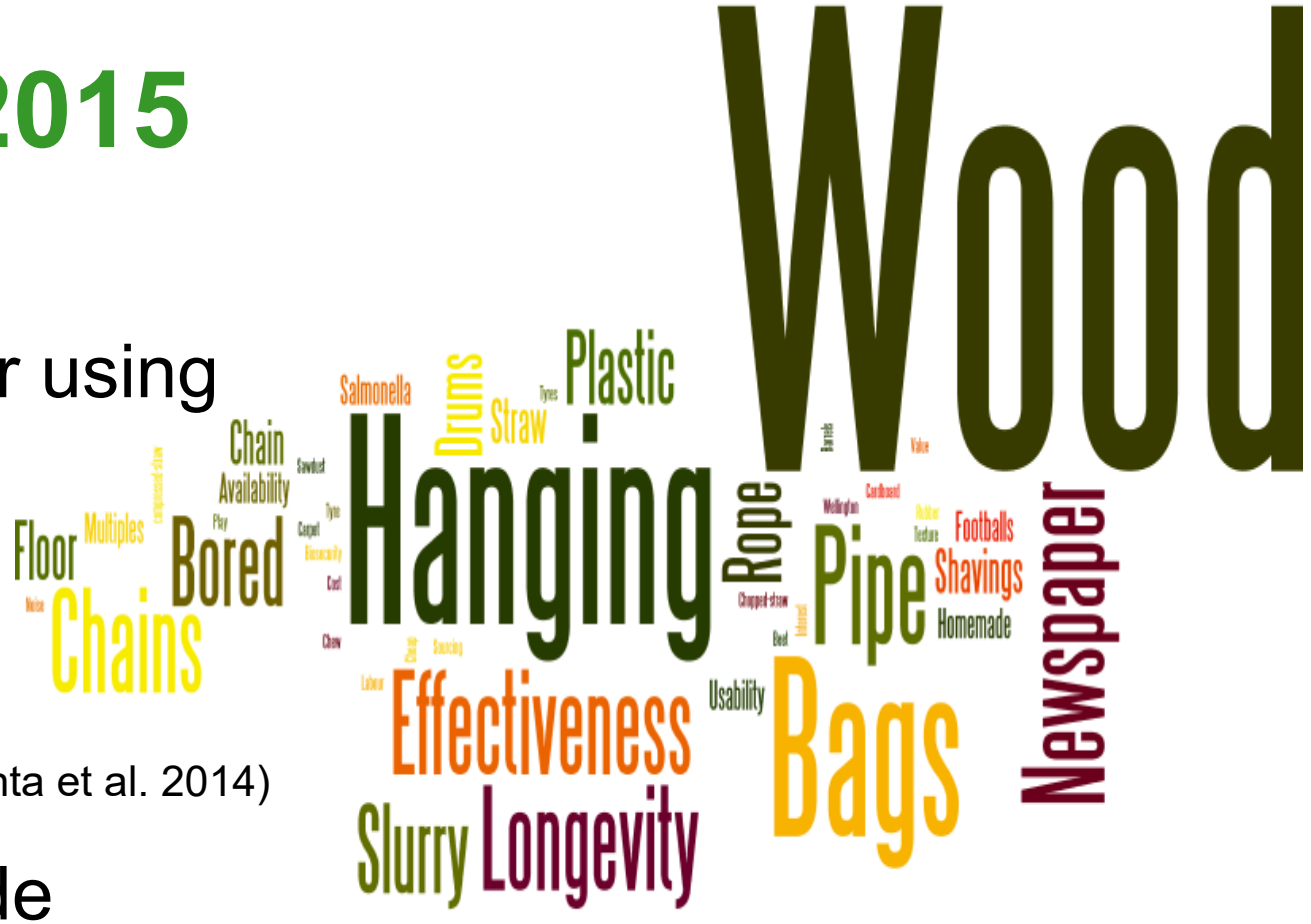
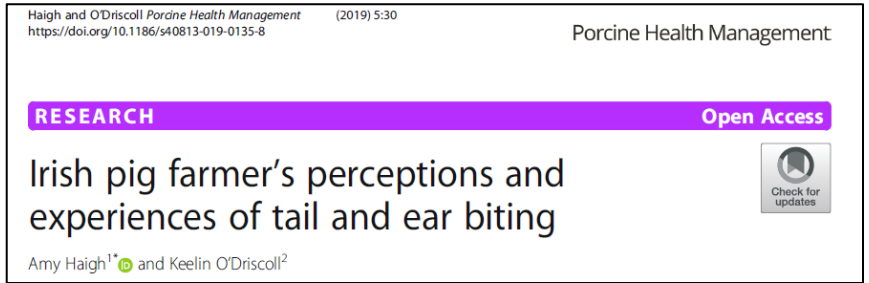
Enrichment in use in 2015

81% stated they would consider using additional enrichment



- 'Fresh' branches effective (Telkanranta et al. 2014)
- Readily available, easy to provide
- Lasts a long time, but degradable


Haigh and O'Driscoll *Porcine Health Management* (2019) 5:30
https://doi.org/10.1186/s40813-019-0135-8

Porcine Health Management

RESEARCH Open Access

Irish pig farmer's perceptions and experiences of tail and ear biting

Amy Haigh[1*] and Keelin O'Driscoll[2]

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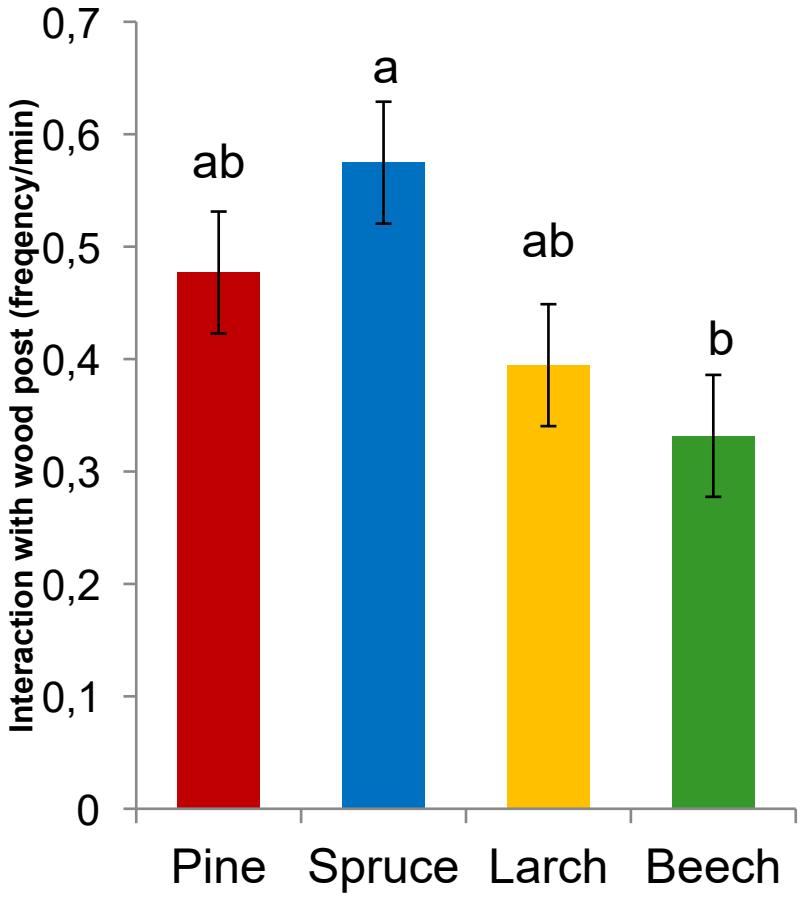
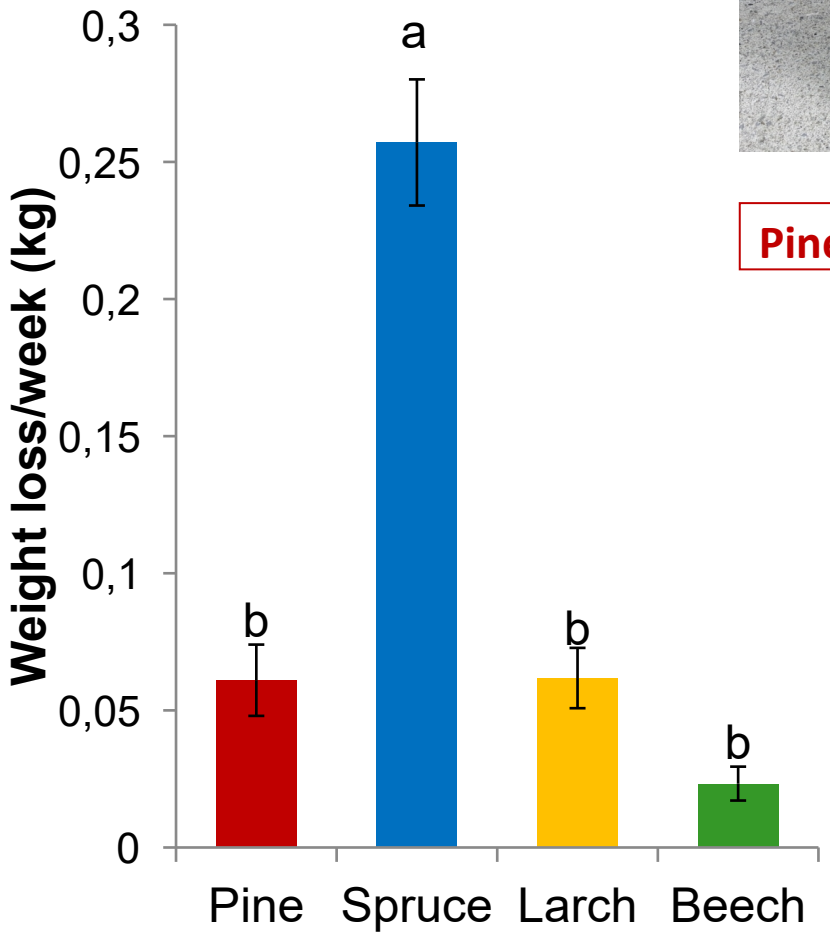
Does wood type matter?





Pine Beech Larch Spruce


Livestock Science 213 (2018) 19–27

Contents lists available at ScienceDirect

Livestock Science

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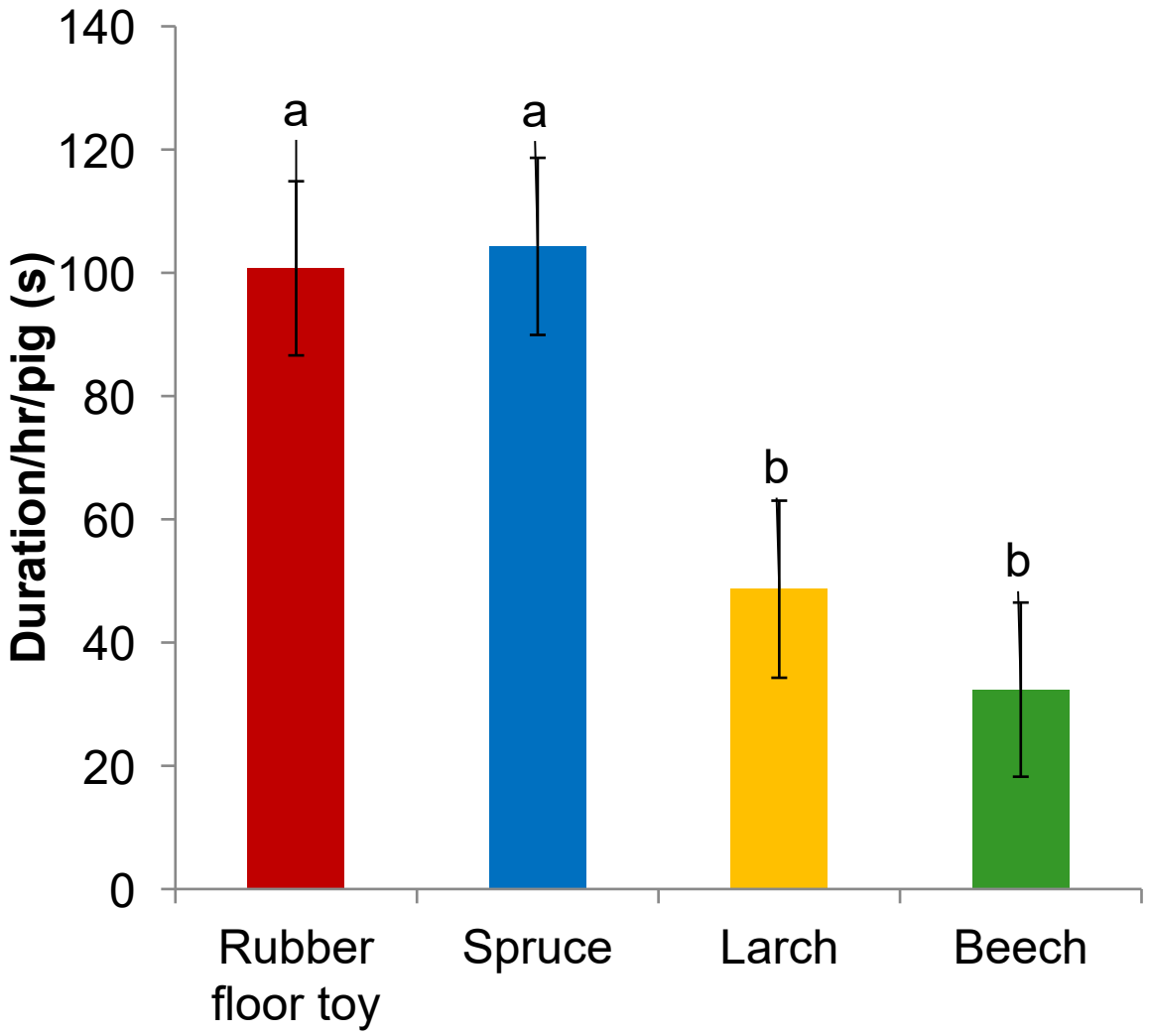
Wood v's rubber floor toy



Applied Animal Behaviour Science 224 (2020) 104944

Contents lists available at ScienceDirect

Applied Animal Behaviour Science

journal homepage: www.elsevier.com/locate/applanim

Enrichment use in finishing pigs and its relationship with damaging behaviours: Comparing three wood species and a rubber floor toy

Jen-Yun Chou[a,b,c,*], Rick B. D'Eath[b], Dale A. Sandercock[b], Keelin O'Driscoll[a]

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Do these materials satisfy the pigs needs?

NO!

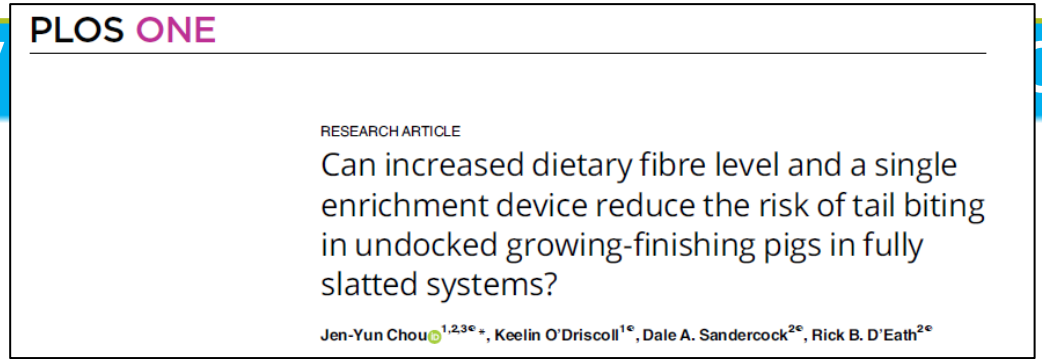
45% of pens experienced a severe outbreak (20% tails w blood)

Finisher

Toy

oy

Spruce



PLOS ONE

RESEARCH ARTICLE

Can increased dietary fibre level and a single enrichment device reduce the risk of tail biting in undocked growing-finishing pigs in fully slatted systems?

Jen-Yun Chou[1,2,3☯*], Keelin O'Driscoll[1☯], Dale A. Sandercock[2☯], Rick B. D'Eath[2☯]

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Is it possible at all to rear undocked pigs in our facility?

Next step: Optimise enrichment + reduce stocking density

animals

MDPI

Article

Rearing Undocked Pigs on Fully Slatted Floors Using Multiple Types and Variations of Enrichment

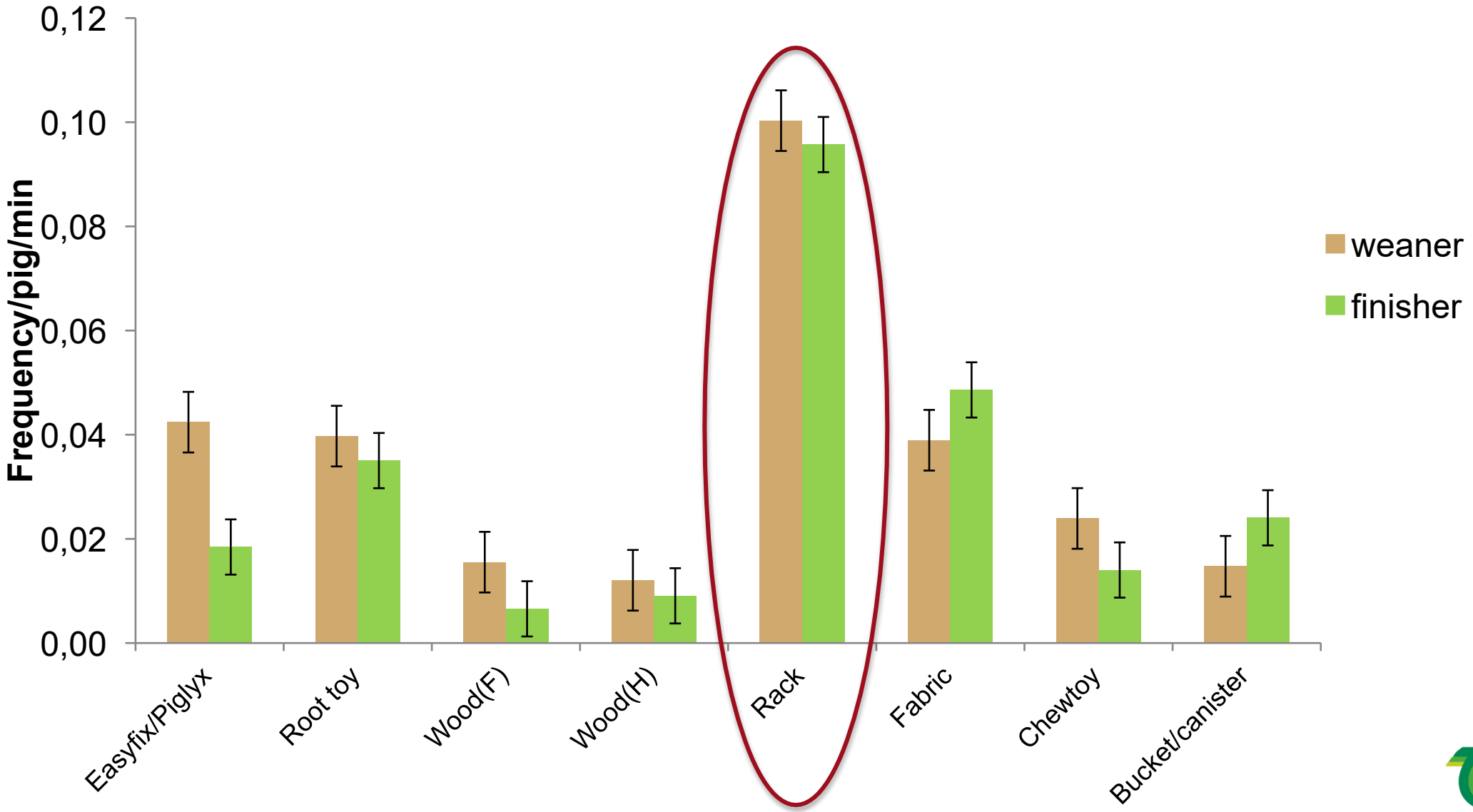
Jen-Yun Chou [1,2,3,*], Constance M. V. Drique [4], Dale A. Sandercock [2], Rick B. D'Eath [2] and Keelin O'Driscoll [1]

Combinations of materials with properties important to pigs

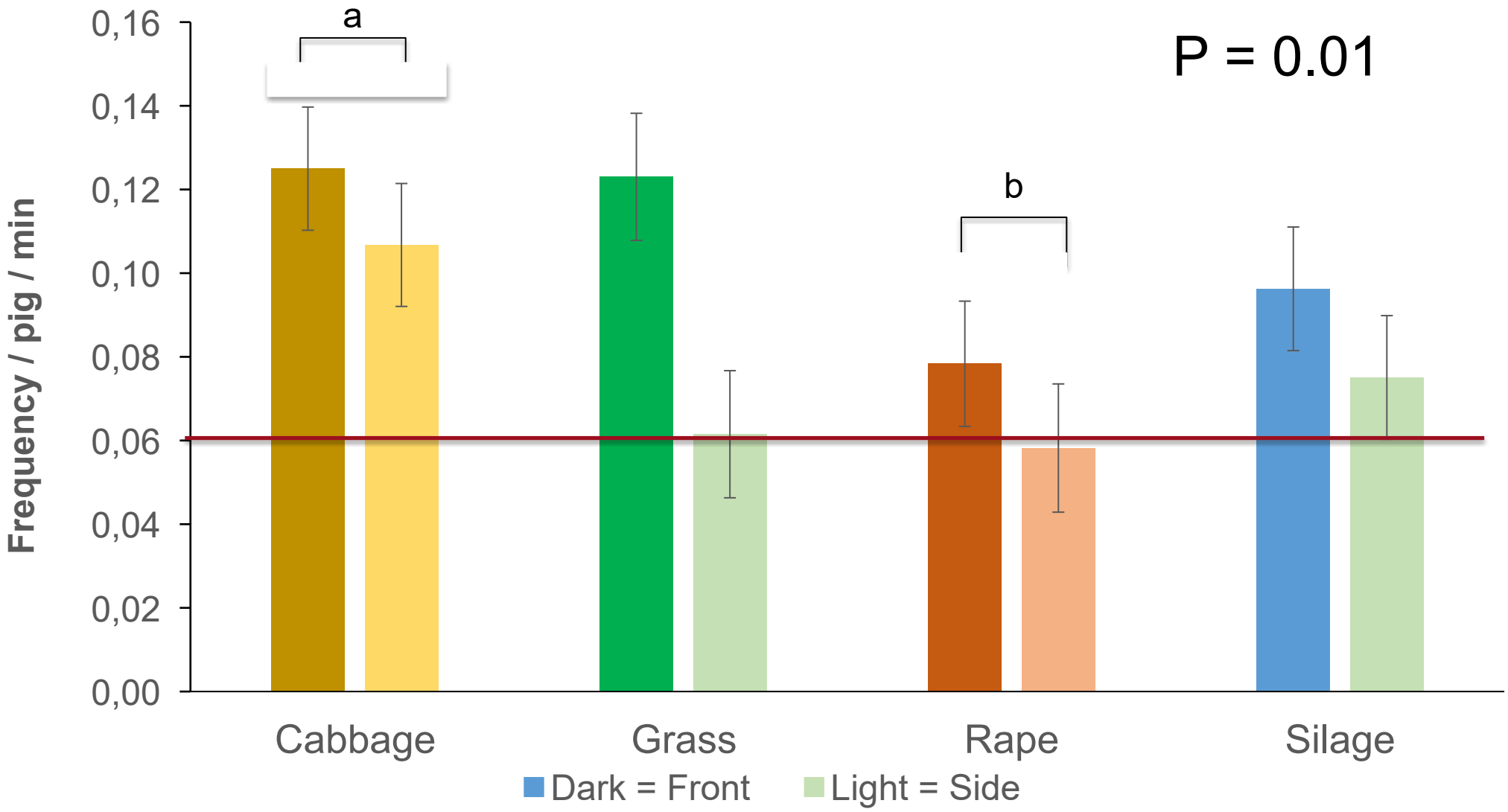
	Properties (Van De Weerd et al., 2003)					
Category	Rootable	Durable	Edible	Presentation	Texture	Location
1. Easyfix	Y	Deform	Chew	Move	Soft	Floor
2. Root toy – floor	Y	Deform	Chew	Move	Soft	Floor
3. Wood – holder	Y	Destruct	Ingest	Attach	Hard	Floor
4. Wood – hang	N	Destruct	Ingest	Suspend	Hard	Eye
5. Rack	N	Renew	Ingest	Attach	Loose	Eye
6. Fabric	N	Destruct	Chew	Suspend	Soft	Eye
7. Chewtoy – hang	N	Deform	Chew	Suspend	Soft	Eye
8. Bucket	N	Renew	Ingest	Suspend	Loose	Eye


2017-09-01 13:14:51
CAM01

Interaction with enrichment



Other loose materials



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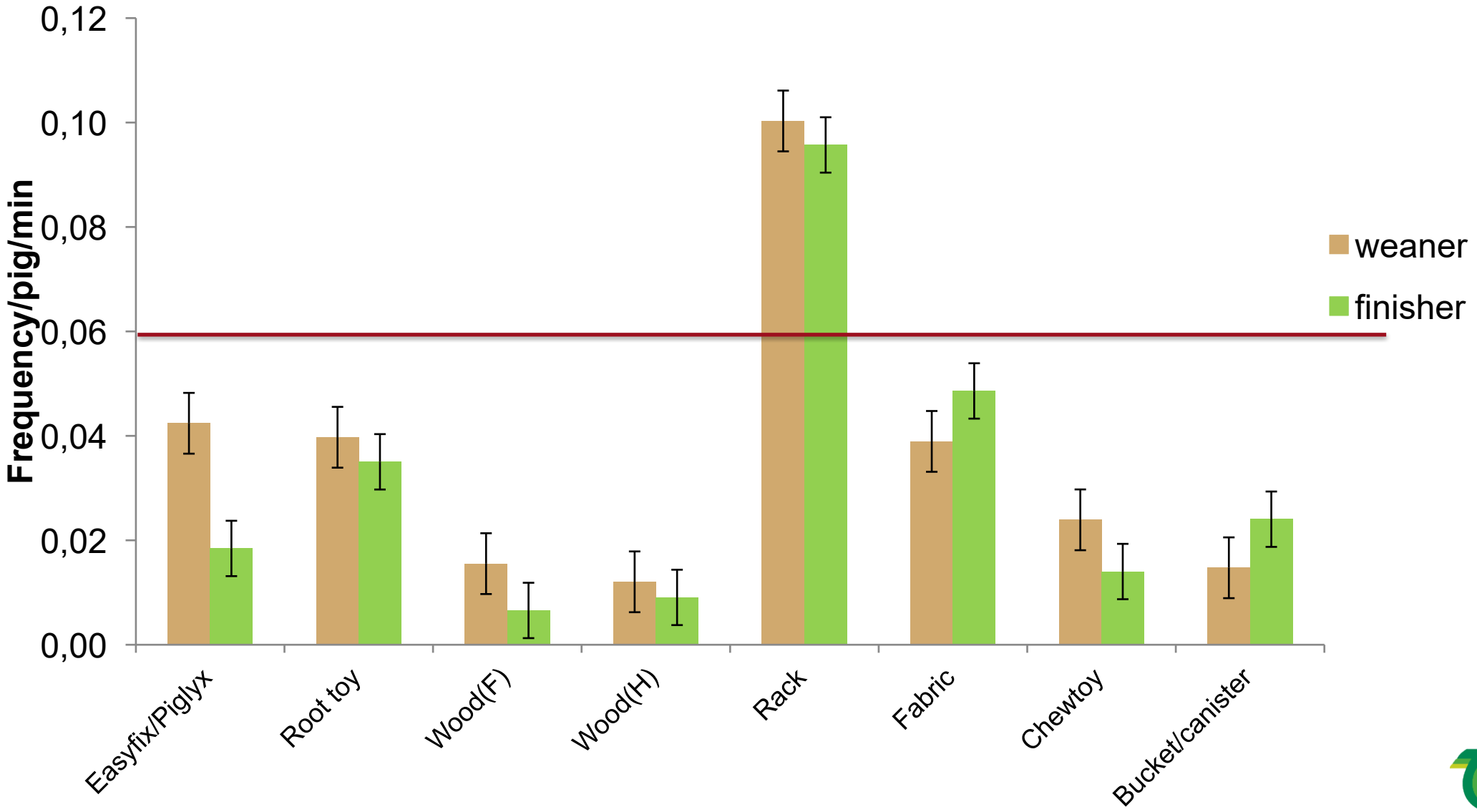
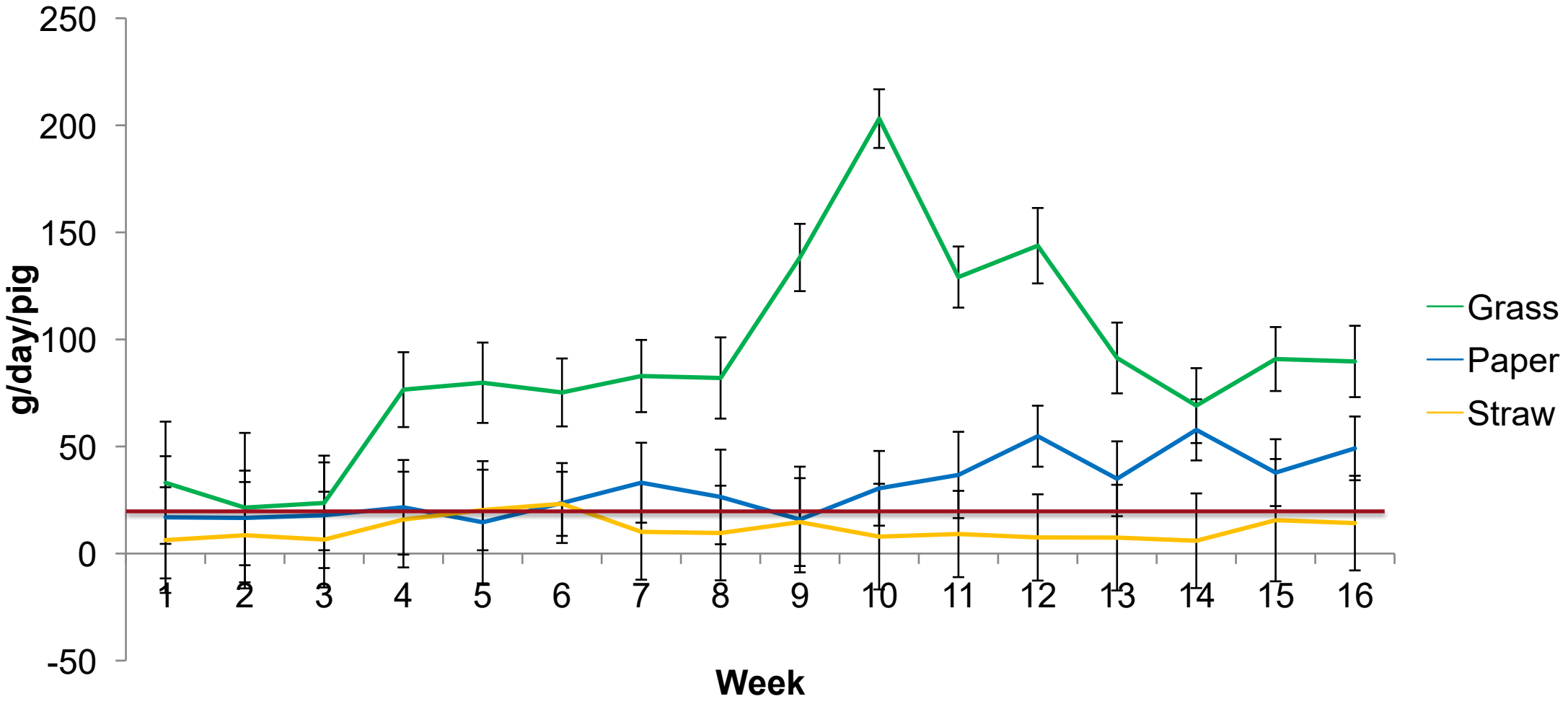
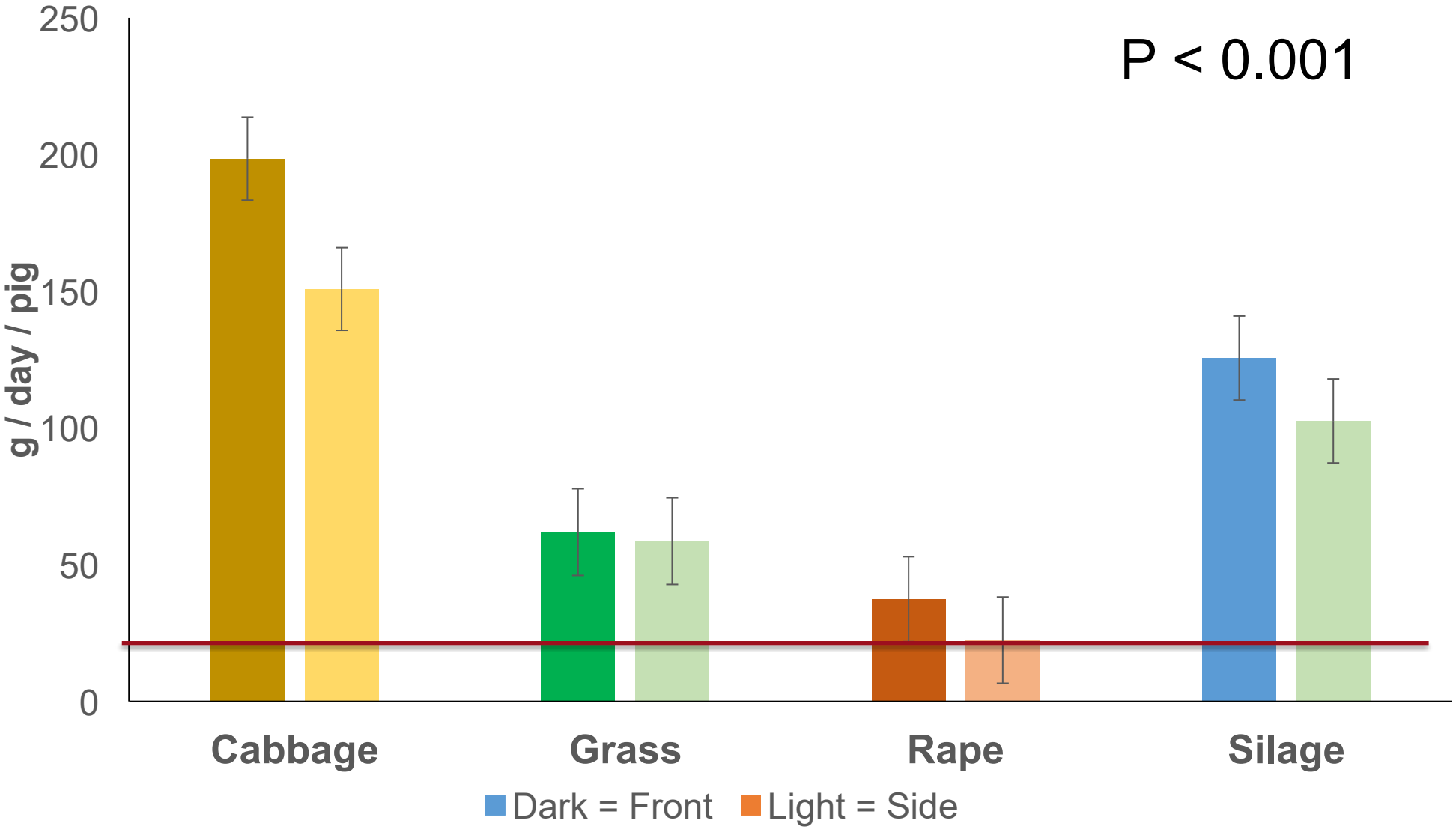
Interaction with Enrichment



Consumption

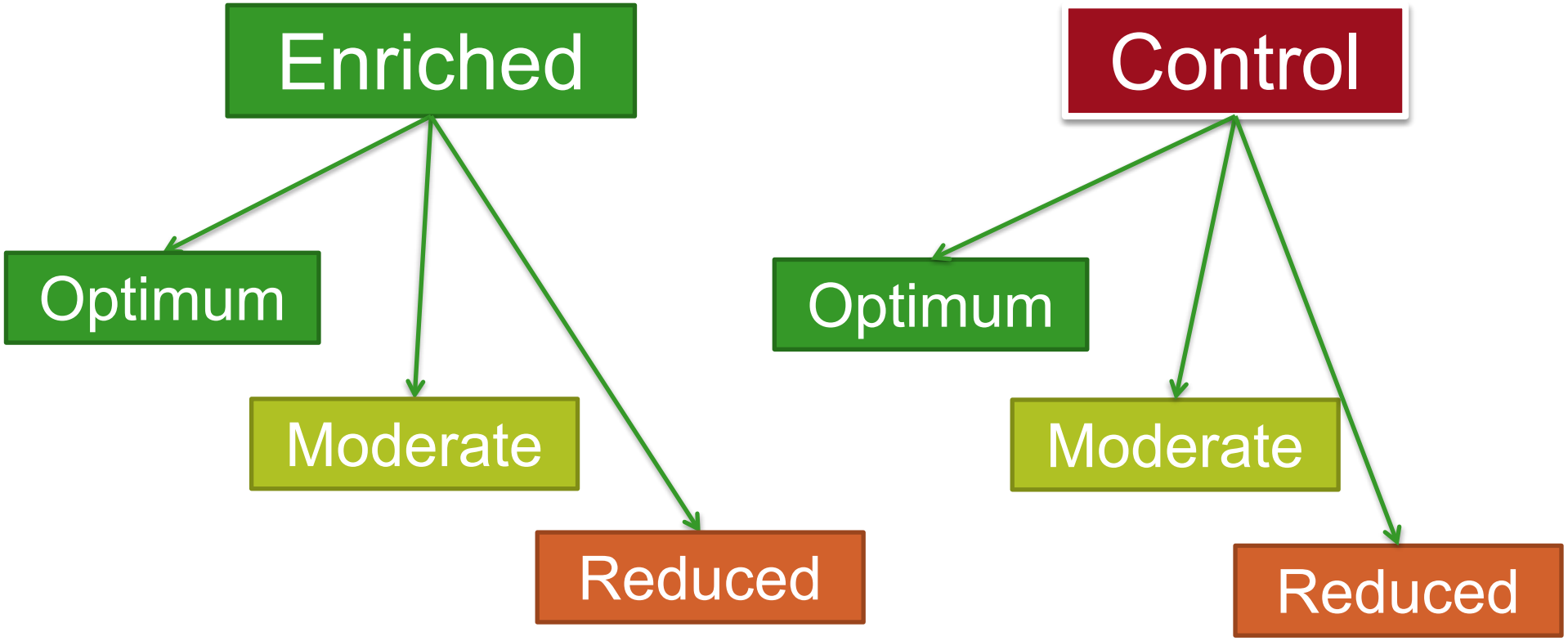


Other consumption

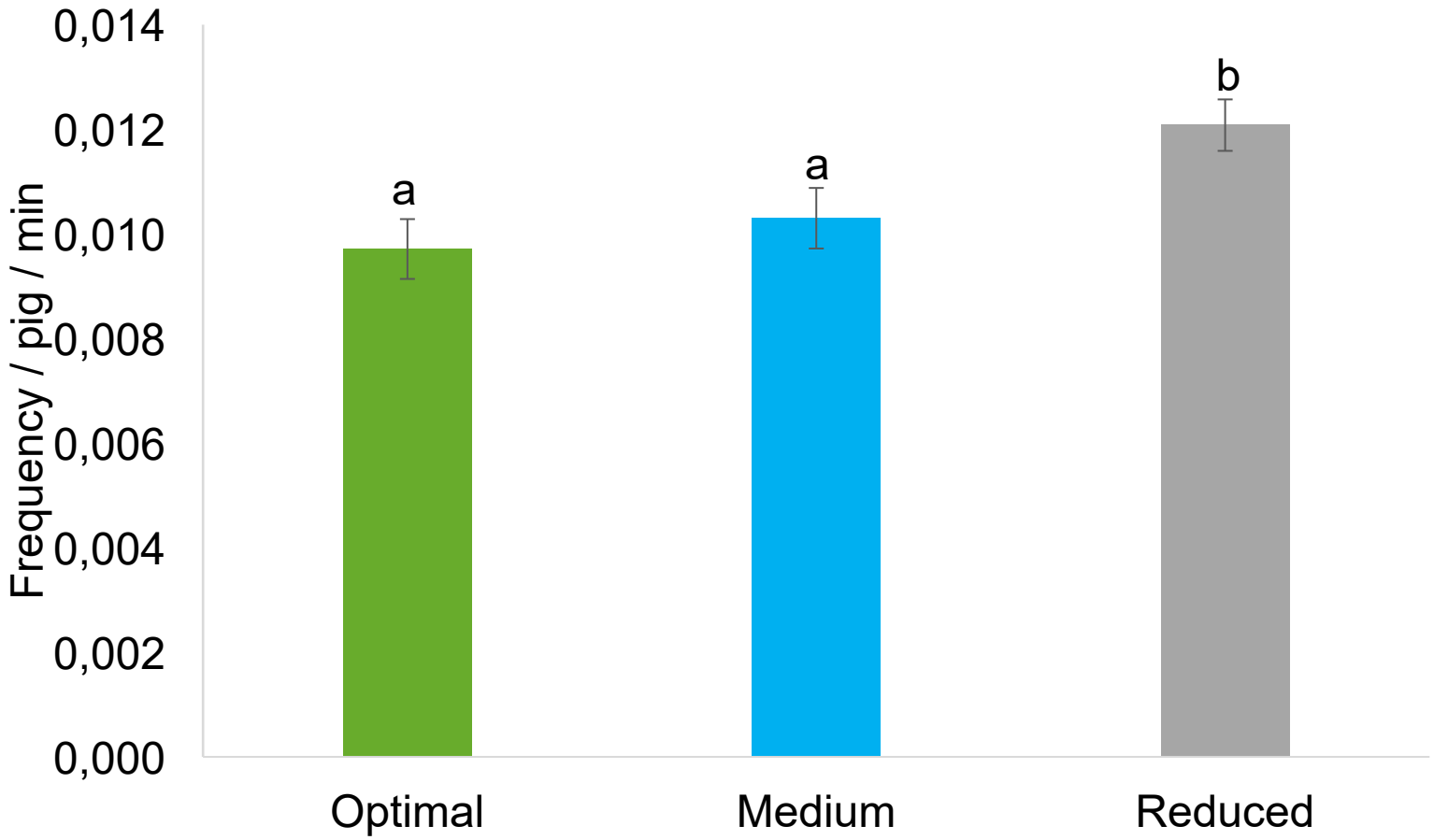


Seemed to work!

… but unfeasible commercially

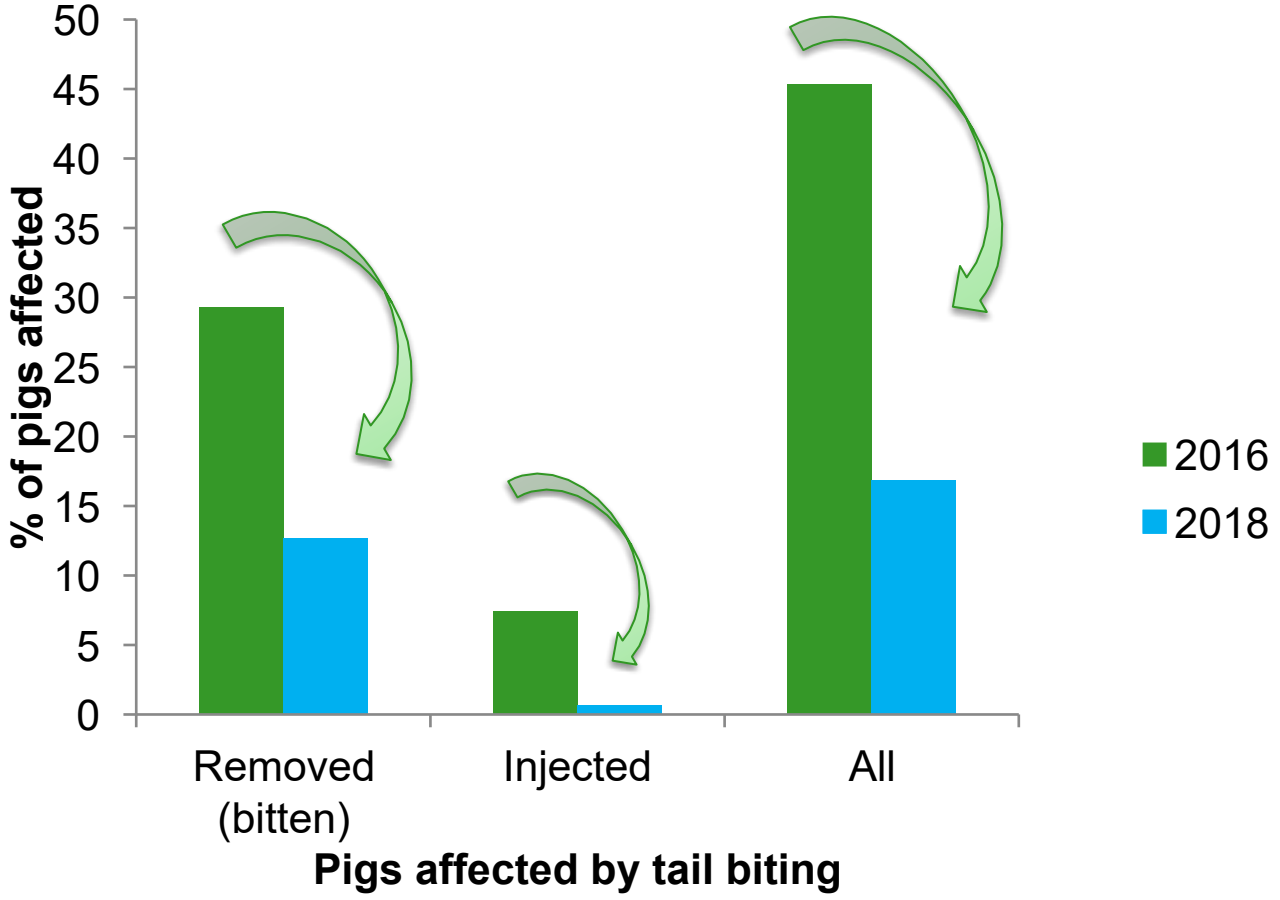


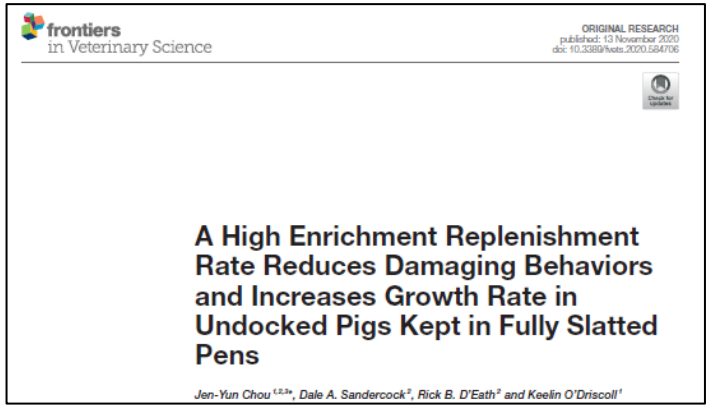
Damaging behaviours (overall)



Tail biting outbreaks

- 14 outbreaks from 12 pens

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ORIGINAL RESEARCH
published: 13 November 2020
doi: 10.3389/fvets.2020.584706

A High Enrichment Replenishment Rate Reduces Damaging Behaviors and Increases Growth Rate in Undocked Pigs Kept in Fully Slatted Pens

Jen-Yun Chou[1,2,3]*, Dale A. Sandercock[2], Rick B. D'Eath[2] and Keelin O'Driscoll[1]

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What did we learn…

- Quantity and quality of enrichment is essential to consider
- Loose material possible, and it's highly favoured

However

- Other factors at play
  - Facility design could also be involved

So what to try next?

Feeder space

- Competition considered a risk for biting
- Dry / wet feeders: Recommend 10 – 12 pigs
- ‘Sudden forceful’ biting behaviour observed
- Easy to install double spaced replacements

Domain 1: Nutrition

Domain 2: Physical Environment

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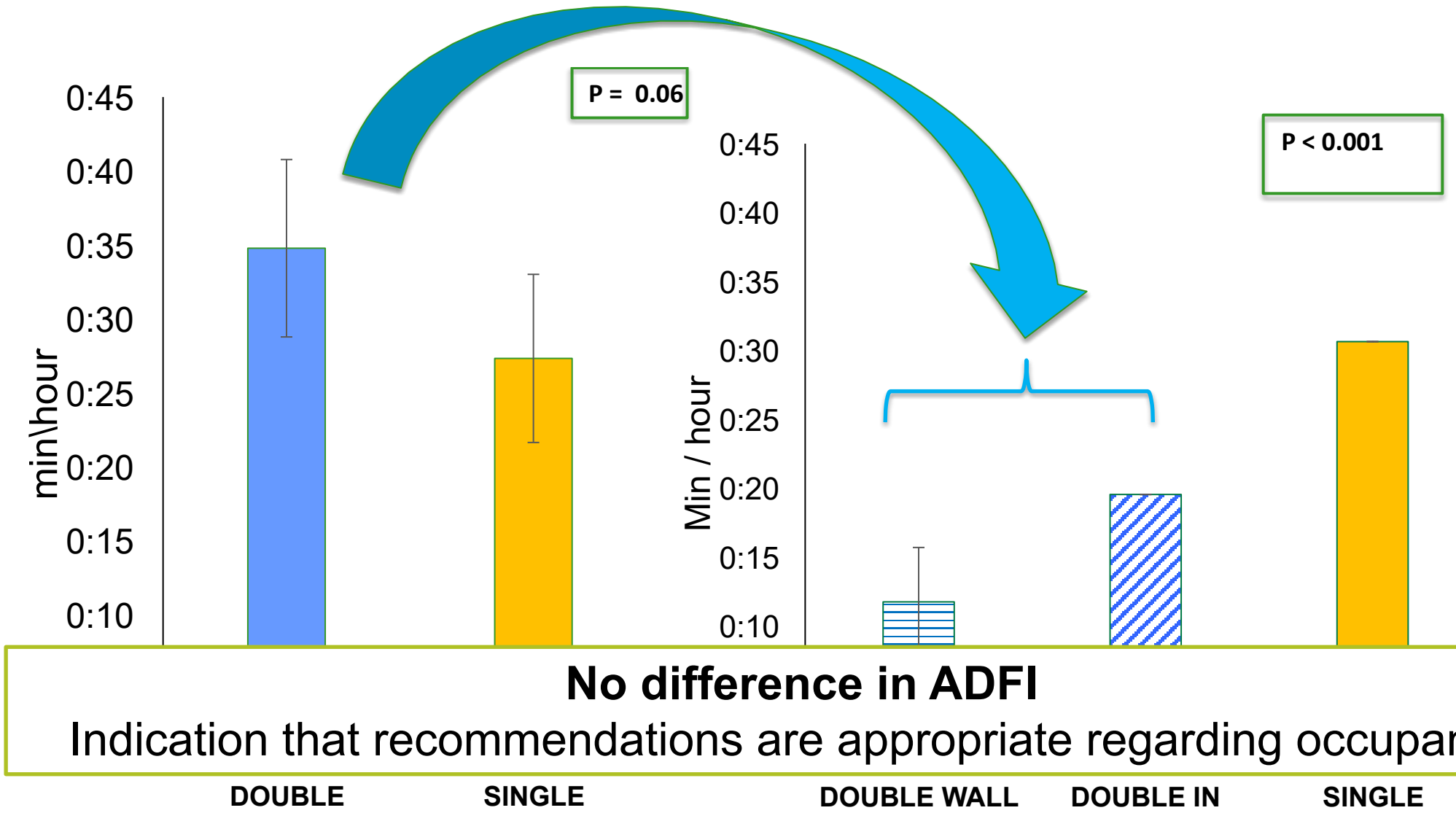
Feeder occupancy



No difference in ADFI

Indication that recommendations are appropriate regarding occupancy!

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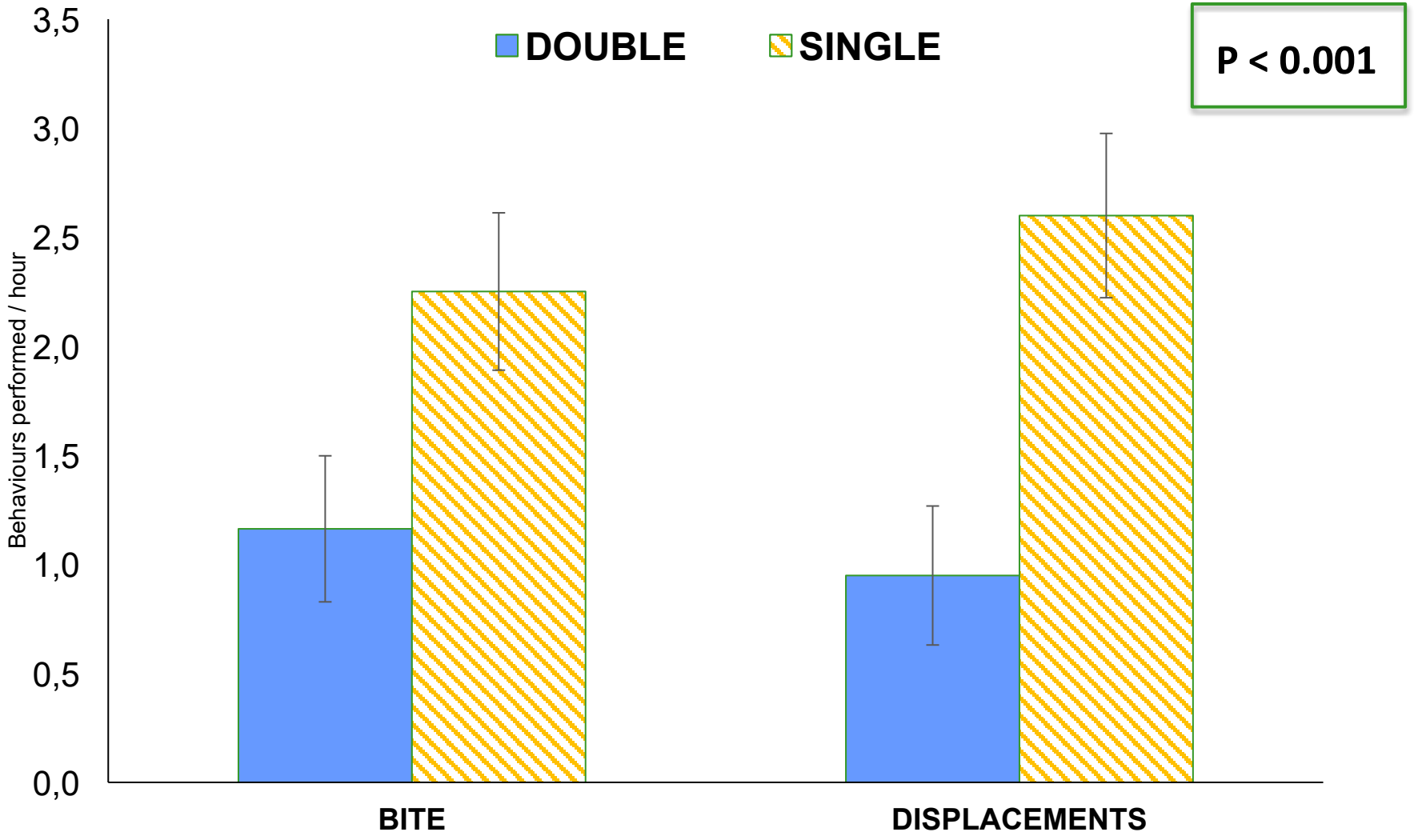
Behaviour at the feeder



Other effects

- No effect on aggressive and damaging behaviour at pen level
  - *Behaviour sampling method?*
- FCR improved in Double (1.85 g/g *v's* 1.9 g/g; P = 0.015)

frontiers | Frontiers in Veterinary Science

TYPE Original Research
PUBLISHED 22 February 2023
DOI 10.3389/fvets.2023.1073401

Check for updates

OPEN ACCESS

EDITED BY
Marcella Guarino,
University of Milan, Italy

REVIEWED BY
Lee Johnston,
University of Minnesota, United States

Comparison of single- and double-spaced feeders with regard to damaging behavior in pigs

Roberta Maria D'Alessio[1,2]*, Alison Hanlon[2] and Keelin O'Driscoll[1]

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How are we doing overall with undocked pigs...

	Pens	Outbreaks	Per pen	Amputation (%)
Wood + rubber toy	48	26	0.54	66.9
High enrichment	8	0	0.00	0.01
Replacement rate	48	14	0.29	27.4
Feeder space	24	7	0.29	31.3

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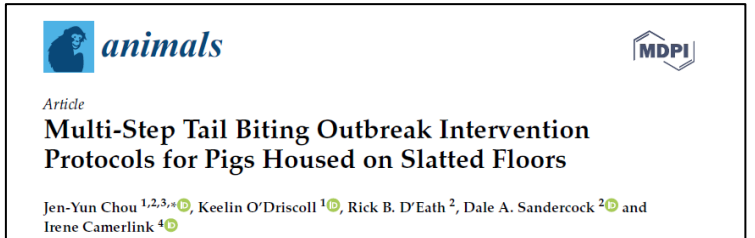
Next steps

- Space allowance + other loose materials (abstract 240: 10:00)
- Commercial farm work: Risk assessment protocol (abstract 239: 09:30)

- Social science: Talking to vets and producers

- Also need to address husbandry, and work with farm advisors
  - E.g. outbreak control protocol published, but is it used?


animals

MDPI

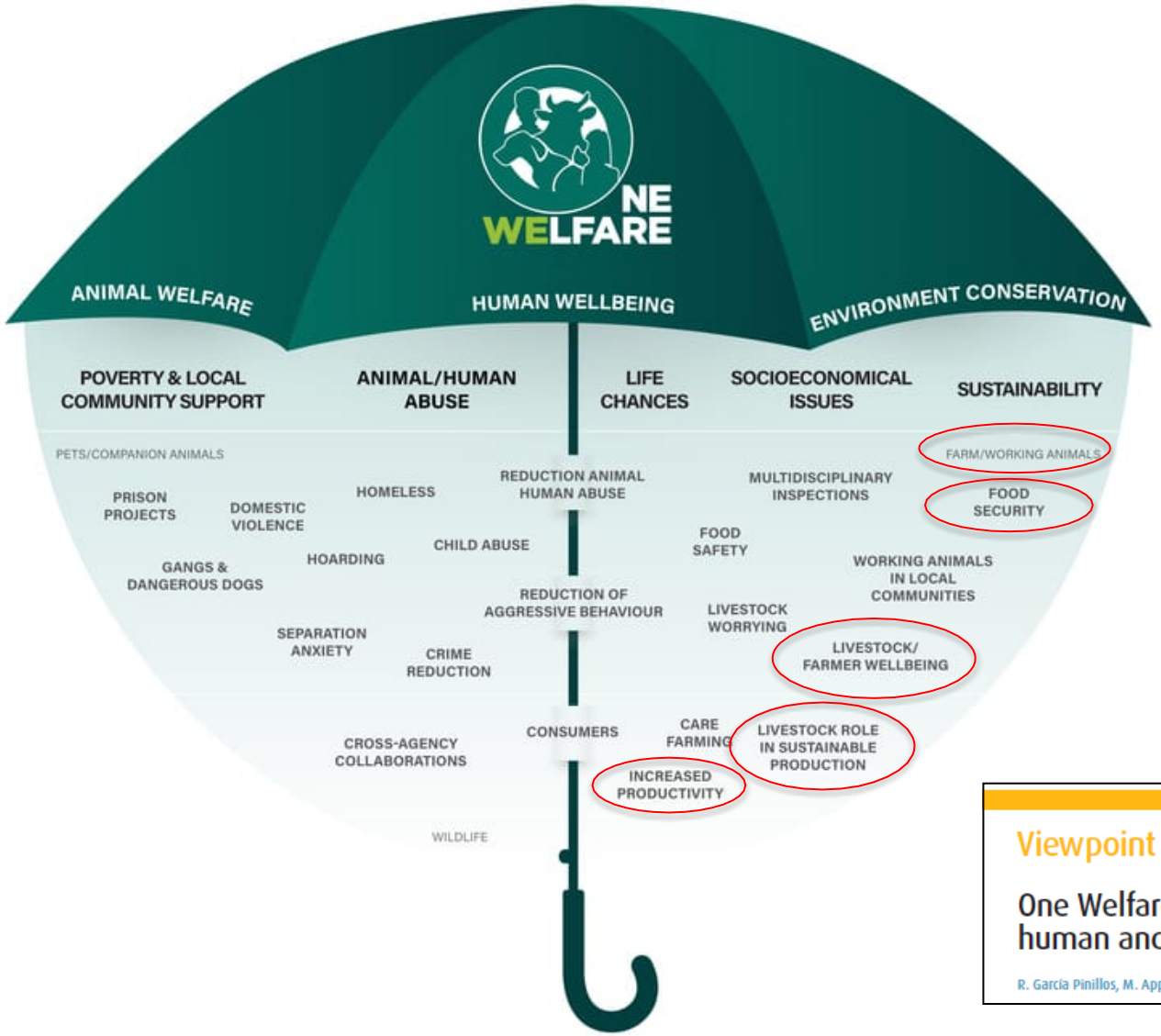
Article

Multi-Step Tail Biting Outbreak Intervention Protocols for Pigs Housed on Slatted Floors

Jen-Yun Chou [1,2,3,*], Keelin O'Driscoll [1], Rick B. D'Eath [2], Dale A. Sandercock [2] and Irene Camerlink [4]

Beyond the status quo

- Adaptations to conventional systems
- New building built in Moorepark
  - Low emission / high welfare



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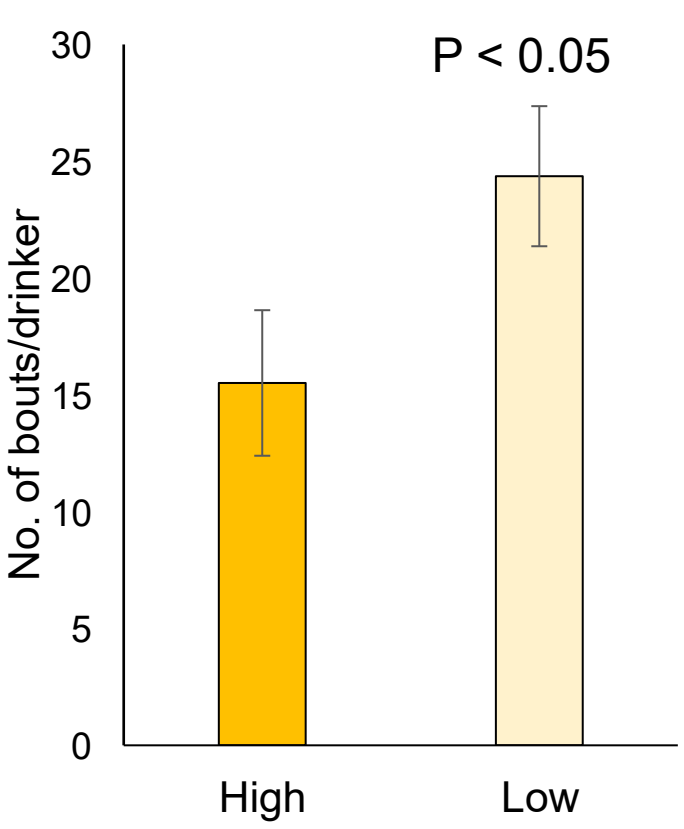
Looking at water use

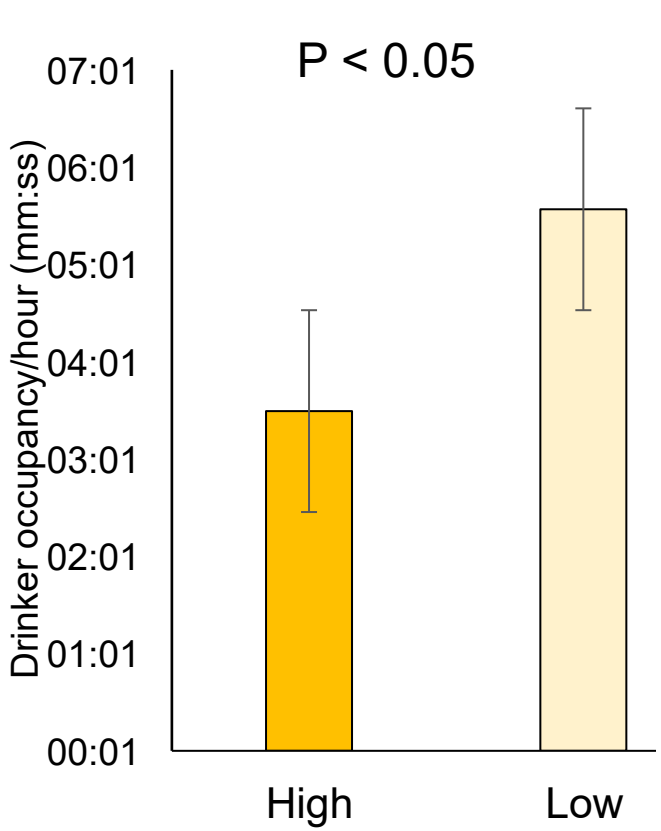
- Group size + enrichment provision

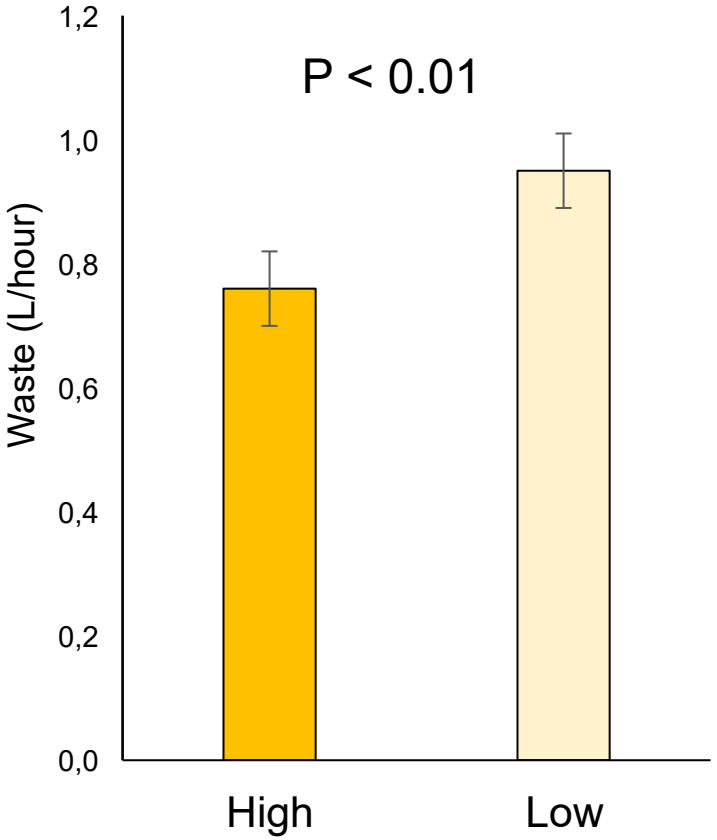
- Small (12 pigs)
- Medium (24 pigs)
- Large (48 pigs)

- Plank of wood + rubber toy
- As above, with a rack of grass

Enrichment + water use







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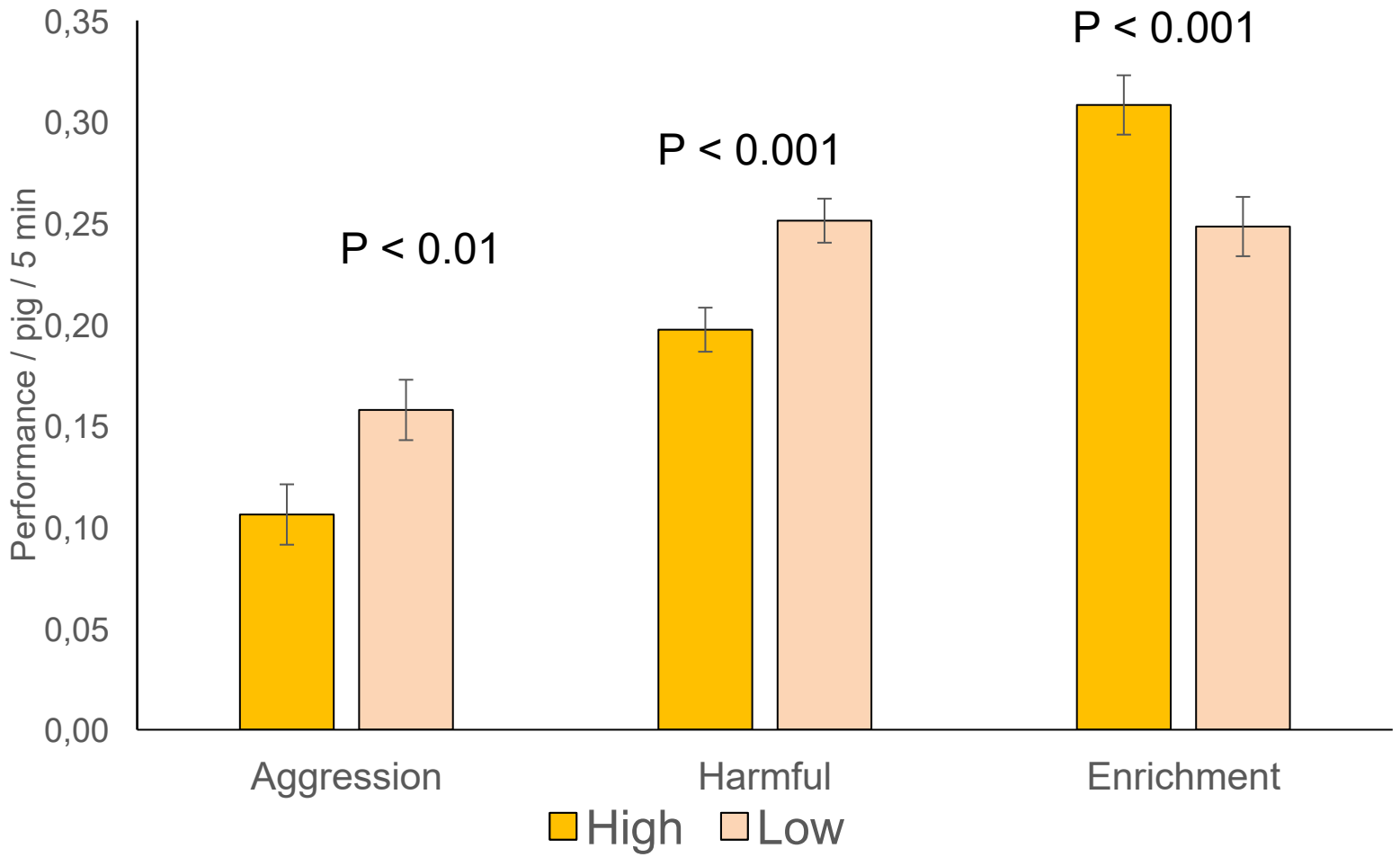
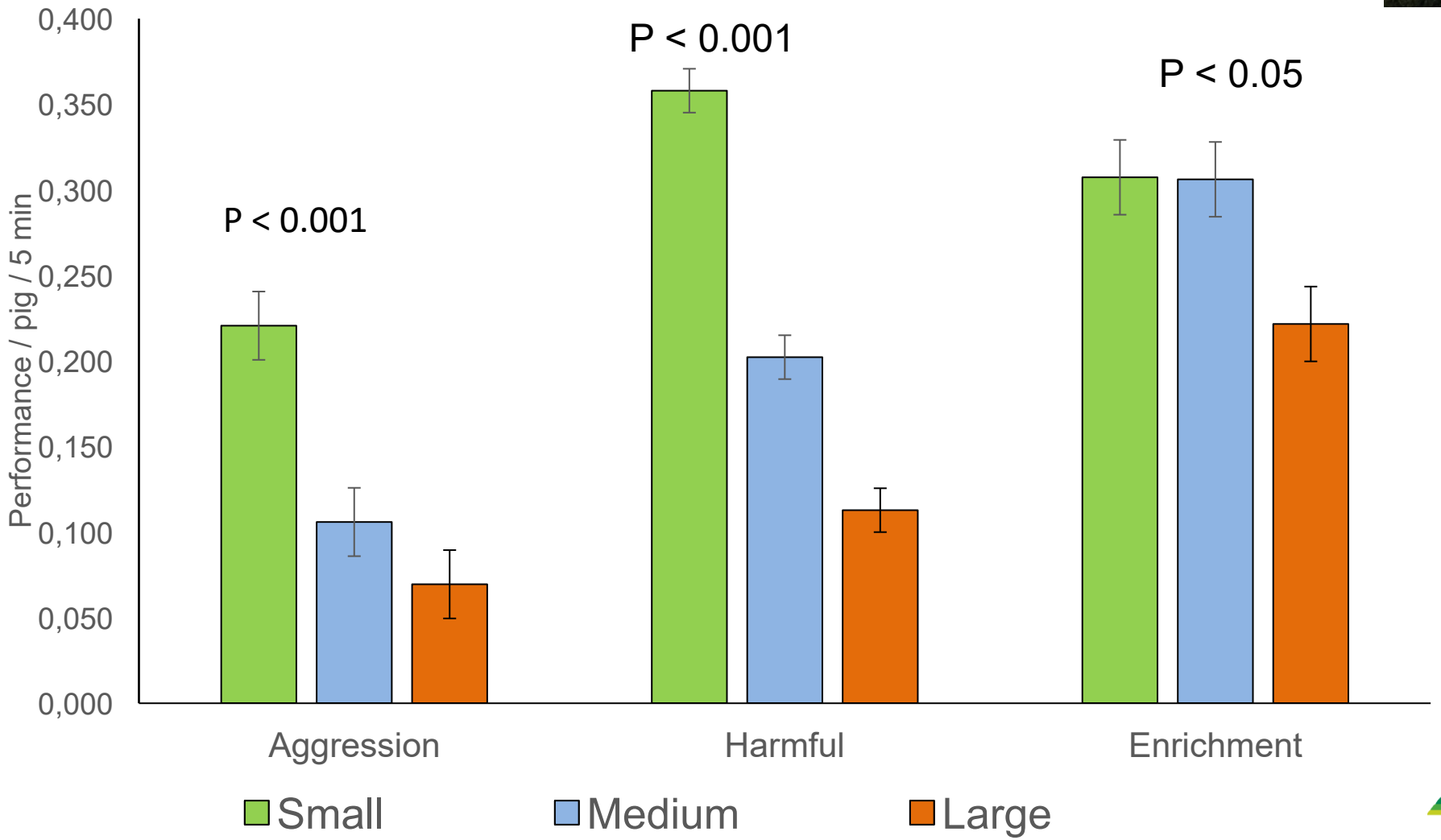
Enrichment + behaviour



Group size



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↓ water wasted

↓ aggressive behaviour

↓ slurry storage

↓ damaging behaviour

↓ nutrient dilution

www.nature.com/scientificreports

scientific reports

Check for updates

OPEN

Effect of environmental enrichment and group size on the water use and waste in grower-finisher pigs

Shilpi Misra[1,2✉], Eddie A. M. Bokkers[2], John Upton[3], Amy J. Quinn[1] & Keelin O'Driscoll[1]

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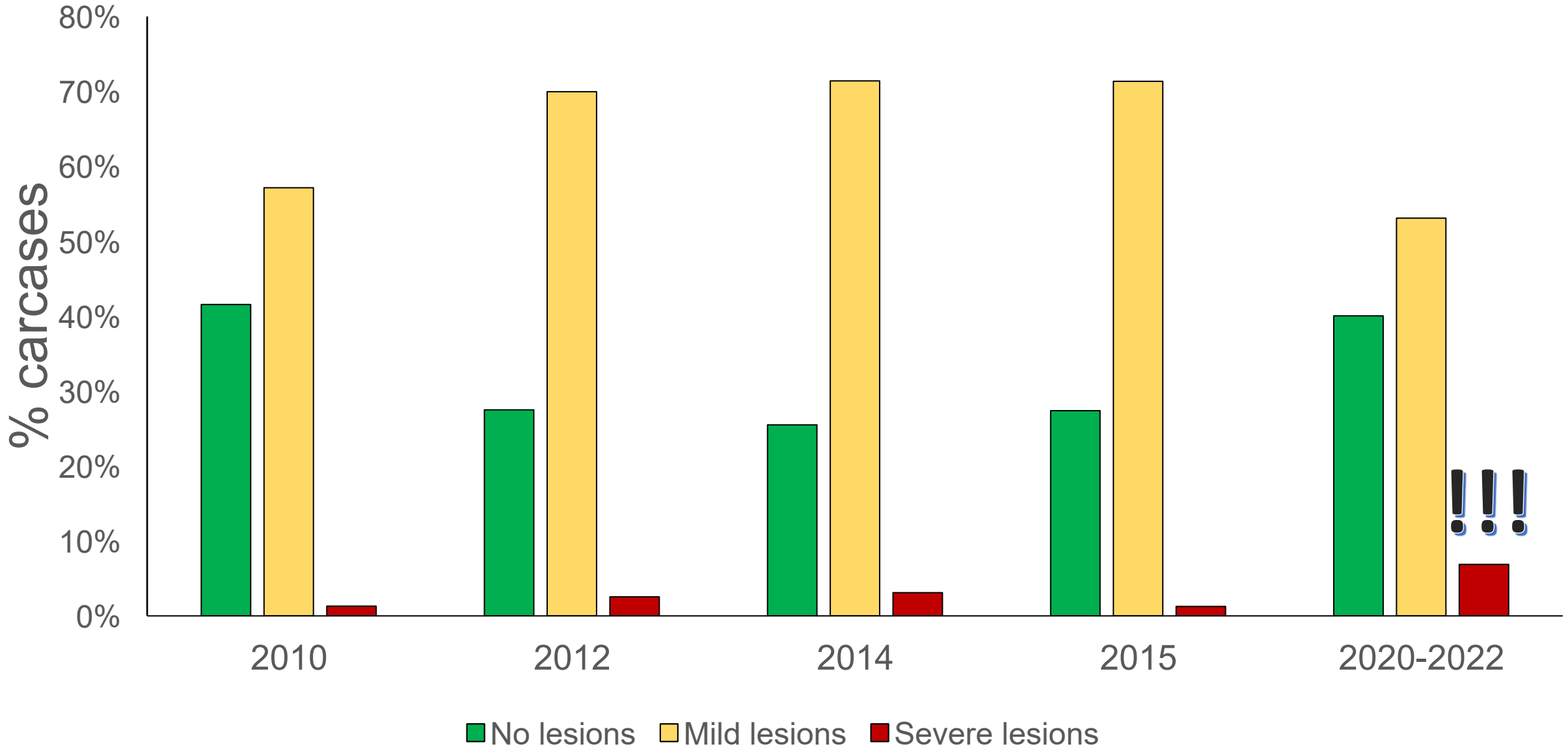
Where do we go from here?

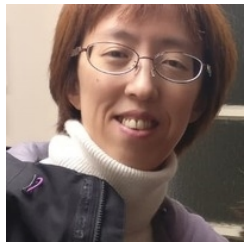


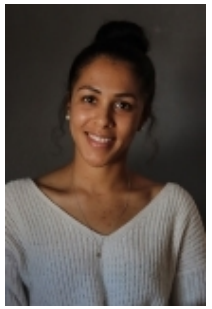
My final thoughts…

- Being able to rear pigs without mutilation should be a starting point, not an end
  - The studies described did not go beyond dealing with Domains 1 - 4
  - Typical Irish systems present risks that are too high to stop docking
- Regulations and recommendations need to be changed
  - Simply meeting the current legislative standards will not allow routine rearing of pigs without docking
  - All countries that don't allow docking require more space to be provided
- Production systems that have been validated and refined to be 'efficient' have in general been investigated using docked pigs
  - Systems that ignore behavioural needs are not compatible with good welfare, and thus may need to be phased out

Acknowledgements!

- Dr Jen Yun Chou
- Dr Amy Haigh
- Dr Shilpi Misra
- Roberta D'Alessio
- Melissa Cupido
- Neil Tirchett
- University + Teagasc collaborators
- Farmers
- Slaughterhouses





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Thank you

Questions?!