Long term effect of early vs. late enrichment with scented newspaper in growing pigs

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APPLICATION FOR PRODUCERS

Consider giving scented newsprint as enrichment to growing pigs to reduce aggression, increase ease of handling, and improve growth performance.

SUMMARY

Environmental enrichment can reduce damaging behaviours like tail biting, but practical information on enrichments for growing pigs is lacking. A previous study showed that scented newsprint was a promising enrichment type. The current study examined the long-term effect of early vs late enrichment with scented newspaper on pig growth and the development of damaging behaviours. A total of 240 piglets received scented newsprint three days per week (Enriched [E]) or no enrichment (Control [C]) from 2-8 weeks of age (Early) and/or from 8 weeks-slaughter (Late) to create 4 distinct treatments: Enriched early and late (EE), Enriched early/Control late (EC), Control early/Enriched late (CE), and Control early and late (CC).

The results showed that the effects of EE and CE treatments had the best performance and the lowest incidence of damaging behaviour. These were followed by the CC treatment, with EC pigs showing the poorest performance in growing and finishing. The EE treatment showed the least pen-mate manipulation and other benefits; thus, we conclude that early enrichment was important in influencing behaviour later in life.

INTRODUCTION

Tail biting is a behavioural problem that impacts pig welfare and the economics of production. Providing enrichment early in life may reduce the frequency of severe tail bites during the finishing stage. Research is needed to determine the best timing of enrichment and the type(s) of enrichment that are most effective.

Moreover, improper or inconsistent use of enrichments may have a negative impact and decrease animal welfare. For example, when pigs are moved from an enriched environment to a barren environment, they can show increased levels of problem behaviours such as tail biting or manipulation of pen fixtures. Also, if a limited amount of enrichment is provided, it can increase competition and aggression. There is limited research looking into the effects of providing enrichments during only a portion of the pig's life, be that early (farrowing/nursery) or late (finishing).

This project aims to identify enrichments that are not only beneficial to the pigs' health and welfare but are also practical and cost-effective for producers to incorporate. A previous study in this project confirmed that pigs prefer enrichment items that are destructible, deformable, and chewable. Based on the high levels of activity observed with scented newsprint, as well as low materials cost, lack of issues with the liquid manure system and the ability of this treatment to retain novelty over time, it was selected for use in the current study. This study examined the long-term effect of early vs late enrichment with scented newspaper on pig growth and the development of damaging behaviour.

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EXPERIMENTAL PROCEDURES

A total of 240 piglets were assigned to one of two treatments from 2 to 8 weeks of age (farrow room and nursery period): Enriched (E) pens received three days per week newsprint scented with a diluted citrus-based product (Phytozen®, Probiotech International Inc., St. Hyacinthe, QC, Canada) that is known to reduce aggression, or Control (C). When pigs moved to the grow-finish pens at 8 weeks of age, half of the Enriched pigs were switched to the Control treatment and vice versa to create 4 distinct treatments: Enriched early and late (EE), Enriched early/Control late (EC), Control early/Enriched late (CE), and Control early and late (CC). All grow-finish pens had a chain to comply with the Code of Practice requirement for enrichment. Growth performance was measured throughout the trial period. Enrichment use, aggression and the frequency of damaging behaviours were recorded. Tail biting scores were taken weekly in the grow-finish phase. A subset of 20 pigs per treatment were subjected to a series of individual behavioural tests. Post-mortem measures such as blood glucose and cortisol, as well as carcass lesions and quality data were taken on 20 pigs per treatment.

RESULTS AND DISCUSSION

Growth: Results for ADG in early life (2-8 weeks) showed no significant difference between C and E treatment pigs. In late life, from 18-21 weeks of age, pigs that received enrichment (CE and EE treatments) had significantly higher ADG compared to those that did not (CC and EC pigs, P=0.011). Feed consumption and feed to gain (F:G) showed no significant effects of early or late enrichment or their interaction.

Handling: In week 9, E pigs had significantly lower handling scores than C (P= 0.014), with no difference in weeks 3, 4, 18 and 21. When pigs were moved between farrowing and nursery there was no difference in handling time, but when moving from nursery to grow-finish, E pigs took less time to move than C (P<0.05).

Table 1. Means of the change in lesion scores* on five body regions 24 hours pre- and post-mixing at weaning in Control and Enriched pigs.

Item	Control	Enriched	SEM[1]	*P*-value
n	119	118		
Front	2.32a	1.69b	0.05	<0.001
Mid	1.37	1.05	0.10	0.258
Hind	1.28a	0.80b	0.16	<0.001
Ears	1.08a	0.75b	0.31	0.006
Tail	0.53a	0.31b	0.15	0.009

* Lesion scoring system: 0=no injuries, 1=less than 5 superficial injuries, 2=5-10 superficial injuries and/or less than 3 deep wounds, 3=more than 10 superficial injuries and/or more than 3 deep wounds (adapted from the Welfare Quality® Assessment for Pigs)
1Standard error of mean
a,b Treatment estimates on the same row with different letters are significantly different at the 5% significance level (P < 0.05)

Behaviour at mixing: Lesion scores measured 24 h after mixing at weaning showed more lesions on C than E pigs. Control pigs had significantly higher lesion scores in the front, hind, ears, and tail regions than enriched pigs (Table 1). Regarding enrichment use, E pigs were observed to spend more time exploring enrichment than C pigs (P=0.017 and P<0.001 for duration and frequency).

In grow-finish, there was a significant difference in enrichment exploration with CE and EE pigs having longer durations and more frequent bouts of exploring the enrichment compared to CC and EC (P<0.001 for frequency and duration). Pigs that had access to newsprint enrichment throughout life (EE) had significantly more feeding bouts compared to all other treatments (P<0.001).

Social behaviour: Table 2 shows that E pigs had better social behaviour parameters than C pigs (fight duration, enrichment exploration and feeding frequency). EE pigs performed significantly fewer pen-mate manipulations in total than all other treatments (P=0.015), CC pigs performed longer durations of belly manipulation, and EC pigs performed longer durations of tail and ear manipulation. Pigs in the EE treatment consistently had the shortest durations of manipulation (Figure 1).

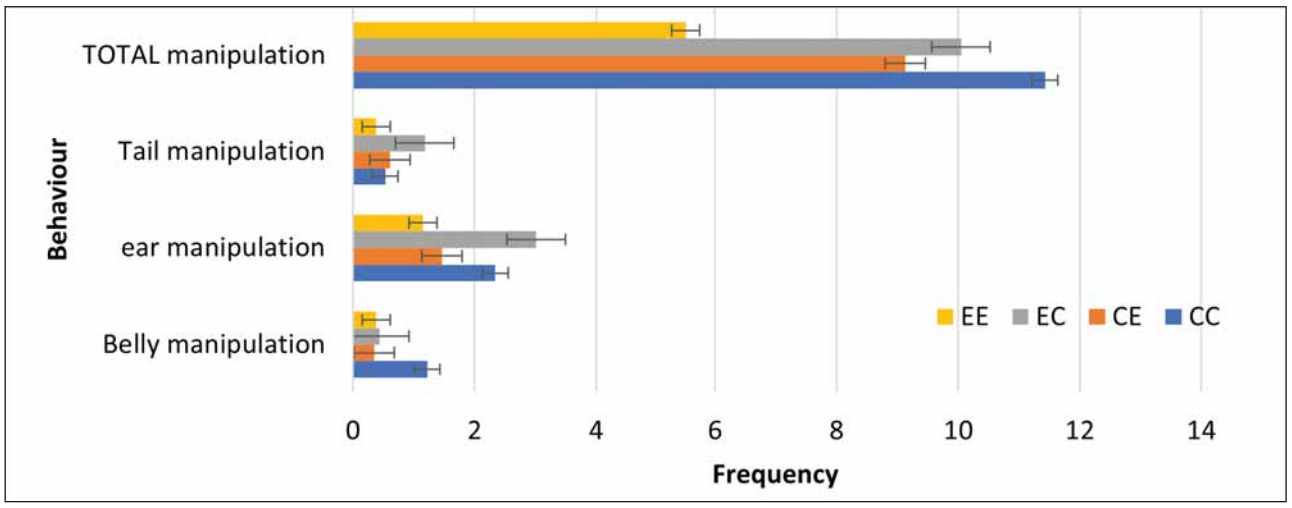

Figure 1. LS means for the effect of early and late enrichment interaction on the frequencies of total, tail, ear, and belly manipulation observed in pigs at 17 weeks of age (50 minutes observation/pig).

Table 2. LS means of behaviours performed by pigs raised in Control (C) or Enriched (E) environments in Early or Late life following mixing when moving into grow-finish at 9 weeks of age

Item	Early		Late		SEM[1]	*P*-value	
	C	E	C	E		Early	Late
n	37	43	43	38			
Fights (duration, s)	55.04	46.26	74.01a	34.31b	1.22	0.573	0.015
Fights (frequency)	5.82b	7.91a	7.03	6.55	1.93	<0.001	0.397
Enrichment exploration (duration, s)	87	107	27b	343a	0.41	0.585	<0.001
Enrichment exploration (frequency)	11.26b	13.24a	5.59b	26.65a	2.02	0.024	<0.001
Feeding (duration, s)	503	542	487	557.69	57.91	0.591	0.327
Feeding (frequency)	12.10b	15.64a	11.24b	16.38a	1.49	<0.001	<0.001

a,b Means within a category on the same row with different letters are significantly different at P< 0.05
1 Standard error of the mean

Lesions in grow-finish: There was a significant interaction between Early and Late environments, showing that EE pigs had significantly lower (better) scores compared to pigs in CC and EC treatments, with CE pigs being intermediate (P=0.032).

Tail biting in grow-finish: Pigs enriched during late life (CE and EE) had significantly reduced tail bite damage between 10-21 weeks compared to CC and EC pigs (P<0.001). EC pigs had the highest average tail bite score, EE had the lowest, and CC and CE pigs were intermediate (Figure 2).

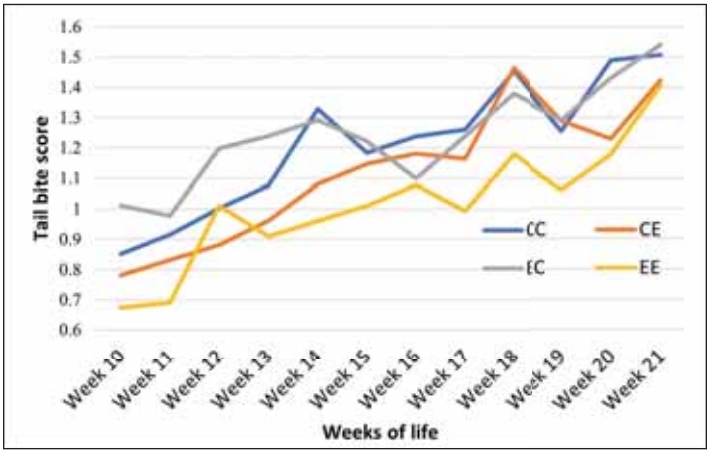

Figure 2. Average tail bite scores from 10-21 weeks of age in pigs in CC, CE, EC, and EE treatments. Scoring system: 0=no evidence of tail biting including redness, bruising, or scabbing, 1=mild/healed lesions, 2=redness of mild puncture wounds, 3=severe redness, deep puncture wound, or swelling. Includes total or partial loss of the tail (adapted from Carroll et al. 2018)

Stress physiology and carcass evaluation: No significant differences were observed between the levels of serum glucose or cortisol in pigs with or without enrichment provision. There was no effect of treatment on carcass lesions. Pigs that received enrichment in early life had significantly higher carcass weight and lean % compared to controls (P=0.040 and P=0.031, respectively).

IMPLICATIONS

Overall, the effects of EE and CE treatments showed the best performance and the lowest incidence of damaging behaviour. These were followed by the CC treatment (minimal enrichment throughout), with CE pigs showing the poorest performance in growing and finishing. The negative result for EC pigs is in agreement with other studies, as it has been determined that going from a positive environment (periodic enrichment) to a more negative environment (no periodic enrichment) has a negative impact on animals' affective state.

Late enrichment (CE and EE treatments) had the greatest benefit for reductions in aggression and tail biting. The EE treatment showed the least pen-mate manipulation and other benefits; thus, we conclude that early enrichment was important in influencing behaviour later in life.

The periodic enrichment of pigs using scented newsprint is deemed a successful treatment. This enrichment had beneficial effects for pigs, as well as being inexpensive and easy to provide.

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