

## Piglet exposure to soil before weaning reduces the post-weaning growth check and increases carcass weight

H.G. Payne\*, B.P. Mullan\*, R.R. Nicholls\*, S.M. McCullough\* and J.R. Pluske\*\*

Department of Agriculture, South Perth, WA 6151. \* Murdoch University, Murdoch, WA 6150.

Weaner pigs produced outdoors have been reported to experience less of a growth check after weaning and to dress out heavier than their indoor counterparts reared in conventional or deep-litter pens (Payne *et al.*, 2003). Pre-weaning nutritional differences that occur between indoor and outdoor production systems may influence subsequent performance. This study was carried out to investigate, in isolation from other physical and behavioural variables, the effects of offering substrates to piglets farrowed indoors that are commonly only available to piglets farrowed outdoors.

Two replicates of 12 multiparous crossbred sows were batch-farrowed in an environmentally controlled room maintained at 22°C in conventional slotted-floor crates with a creep area equipped with a solid floor, hover, heat lamp, 600 mm long feeder and nipple drinker. Piglets were weighed, ear notched, tooth-clipped, tail-docked and injected intramuscularly with 200 mg of iron dextran at 1-2 days of age. Litters were equalised at 10 piglets per sow, although insufficient piglets were available to balance litters for birth weight and sex. After stratification for birth date, litters were allocated randomly to one of three pre-weaning nutritional treatments: 1) control - no creep feed (NC), 2) commercial creep (CF) fed as crumbles and 3) an 'outdoor' mix (OM) of 25 parts soil, five parts sow feed, and one part straw. Treatments were offered from 7 to 28 days of age when litters were weaned and transferred into conventional weaner and grower/finisher pens where they were maintained in litter groups and managed identically until slaughter at 105 kg live weight. Pelleted feed was offered *ad libitum* in a six diet, phase-feeding program during the grow-out phase. Male pigs were immunocastrated using Improvac™ (Pfizer Australia). Six pigs were slaughtered from each treatment on days 28 and 35 and sections taken from the small intestine for histological examination. Differences between treatment means were tested using analysis of variance (Genstat 8<sup>th</sup> Edition, Lawes Agricultural Trust 2005) with litter as the experimental unit and birth weight, sex and fostering as covariates.

**Table 1. Growth and carcass characteristics of pigs offered no (NC), ad libitum creep feed (CF) or an 'outdoor mix' of soil, sow feed and straw (OM) from 7 days of age until weaning at 28 days of age.**

	NC	CF	OM	s.e.d.	P value.
Gain birth to weaning at 28 d (g/d)	265	268	272	10.6	0.764
Gain from 28 d to 35 d (g/d)	70	118	112	16.7	0.011
Gain birth to finish (g/d)	677	677	693	16.7	0.238
Hot carcass weight - Trim 13 (kg)	70.4	70.3	71.8	0.385	0.055
Dressing %	66.0	65.9	66.7	0.358	0.047
Carcass P2 (mm)	12.5	12.8	13.2	0.486	0.357
Feed disappearance 7 to 28 d (g/pig)	nil	449	530	53.0	0.171
Feed disappearance 28 to 35 d (g/pig)	1221	1381	1467	143.9	0.257

Piglets offered CF or OM grew faster ( $P=0.011$ ) in the week after weaning. Overall performance was similar for all treatments ( $p > 0.05$ ) but OM pigs had heavier carcasses and higher dressing percentages than the other treatments ( $P=0.055$  and  $0.047$ , respectively). Villous height and crypt depth were not significantly different between NC, CF and OM piglets at 28 days ( $425, 499, 461 \mu\text{m} \pm 38.3$  and  $175, 173, 187 \mu\text{m} \pm 21.8$ , respectively; mean  $\pm$  s.e.m.) or at 35 days ( $280, 357, 288 \mu\text{m} \pm 27.1$  and  $319, 308, 312 \mu\text{m}$ , respectively; mean  $\pm$  SEM). However, the decrease in villous height and increase in crypt depth at day 35 compared to day 28 were significant ( $P < 0.001$ ), indicating that the pre-weaning treatments imposed did not prevent major changes to gut architecture from occurring during the week after weaning. A potentially confounding factor in this study was the lower Hb content at weaning in the blood of pigs not fed the OM during lactation (Payne *et al.*, 2005), despite all pigs receiving parenteral iron dextran after farrowing. The implication of the difference in Hb levels at weaning on subsequent performance is unknown.

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### References

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