



Large quantities of straw at farrowing prevents bruising and increases weight gain in piglets



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ABSTRACT

Two major welfare issues in current pig production are the lack of nesting material for farrowing sows and poor claw health in suckling piglets. Therefore, a strategic method to supply loose housed sows with large quantities of straw at farrowing has been developed by Swedish piglet-producing farmers. The objective of this cohort study was to estimate the effect of a large quantity of straw (15–20 kg) supplied before farrowing compared to limited daily amounts (0.5–1 kg) on bruising and growth performance in pre-weaning piglets. On each of four commercial piglet-producing farms in south-west Sweden, one batch of sows was studied during two consecutive lactations. At inclusion, sows were randomly assigned to two treatment groups, and sows remaining in the batch during the second lactation switched treatment group. In the STRAW group ($n = 181$ litters) sows were provided with 15–20 kg of chopped straw 2 days prior to expected farrowing. Sows in the CONTROL group ($n = 182$ litters) received 0.5–1 kg of chopped straw on a daily basis plus 2 kg for nest building when the stockperson judged the sow to be about to farrow. Piglets were individually weighed within 36 h after birth, at 3–7 days after birth and at weaning. On day 3–7, limbs and feet were clinically examined for the presence and location of lesions. In conclusion, the provision of 15–20 kg of straw 2 days prior to farrowing effectively prevents the piglets from developing skin abrasions (IRR = 0.38) and soft heel/sole erosions (IRR = 0.08–0.35). We also conclude that the strategic use of large quantities of straw has a positive effect on weight gain, increasing the expected mean body weight at weaning by 0.33 kg.

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1. Introduction

A method for strategic use of large quantities of straw at farrowing for loose housed sows has been developed by a group of Swedish piglet producing farmers (Westin

et al., 2013). These farmers supply their sows with 15–20 kg of chopped straw, which is given as a one-time event 2 days prior to expected date of farrowing. Gradually the straw drains through the slatted floor (Westin et al., 2013) and is then replaced by daily small amounts of straw in accordance with common Swedish management routines. One purpose of the method is to increase the sow's possibility to perform nest building while still kept in a partly slatted pen for loose housed sows. In spite of domestication, sows in confinement perform nest building activities. The nest building behaviour is influenced by both

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hormonal regulation (Algers and Uvnäs-Moberg, 2007) and environmental feedback (Jensen, 1993; Burne et al., 2000). The importance of nest building is well-documented and has recently been reviewed by Wischner et al. (2009). EU Council Directive 2008/120/EC states that “in the week before the expected farrowing time sows and gilts must be given suitable nesting material in sufficient quantity unless it is not technically feasible for the slurry system used in the establishment”. The amount that should be regarded as “sufficient” is however not defined. In addition there is a lack of studies comparing different amounts of nest-building material used within the same housing system.

A second purpose of the described method is to have the whole pen floor area covered with straw during farrowing and the piglets' first days of life, in order to prevent bruising of claws and limbs. Due to a high content of water the claws of newborn piglets have an extremely soft horn tissue, which makes them vulnerable to bruising (Mouttoutu and Green, 1999). Several studies have reported a high prevalence of foot and limb injuries in pre-weaning piglets (Penny et al., 1971; Mouttoutu et al., 1999; Holmgren et al., 2008; KilBride et al., 2009). Piglets with claw and skin abrasions are less active than healthy littermates (Mouttoutu and Green, 1999). It has also been shown that these lesions are associated with lameness, which indicates that they are painful (Zoric et al., 2008), and lower weight gain (Johansen et al., 2004; Norring et al., 2006). Poor claw health of suckling piglets is thus regarded as a major welfare issue in current pig production. It is believed that sufficiently deep bedding on solid floors will protect piglets from the rough concrete surface and thus reduce the level of damage on claws and limbs (Mouttoutu and Green, 1999; KilBride et al., 2009). Provision of 2 kg of chopped straw daily during lactation have been shown to reduce the incidence of lesions but not to prevent them entirely (Zoric et al., 2009).

The described method for the strategic use of a large quantity of straw has been proved to be technically feasible (Westin et al., 2013), and the objective of the present study was to investigate the effects on piglet claw health and growth. We hypothesised that a large quantity of straw (15–20 kg) supplied before farrowing, compared to small daily amounts (0.5–1 kg), prevents bruising and increases growth performance in pre-weaning piglets. The specific objectives were to:

- quantify the preventive effect of a large amount of straw supplied before farrowing on the prevalence of piglet skin and claw abrasions at 5 days of age.
- quantify the effect on piglet daily weight gain during the first 5 days of life, and on body weight at weaning around 5 weeks of age.

2. Material and methods

2.1. Farms, housing and management

The study was carried out as four cohort trials on four commercial piglet-producing farms (A–D) in south-west Sweden (Table 1). On each farm, one batch of sows was studied during two consecutive lactations during 2009. The farms were selected based on the following criteria: (a) farm situated within 50 km from the university campus in Skara; (b) manure system capable of managing large quantities of straw; (c) piglet production based on batch-wise farrowing with at least 30 sows farrowing in the same batch; (d) all sows kept loose housed during farrowing and lactation; (e) the farmer and stockpersons willing to participate in the study.

During gestation, sows were group-housed in deep-litter straw systems with individual feeding stalls. Sows entered the farrowing units 5 to 4 days before the first sow in the batch was expected to give birth. In the farrowing unit, all sows were loose housed in partly slatted farrowing pens. Solid concrete flooring covered 50% of the total pen area. The slurry systems were based on liquid manure with mechanically-operated scrapers directly under the slatted floor. Feeding and management were in accordance with the farms' regular routines. Male piglets were castrated within 7 days of age. Tail docking was not performed. The stockpersons were allowed to apply cross fostering of piglets between litters within the same treatment group. All cross-fostered piglets were individually marked by making a small cut in one ear. All piglets were offered commercial piglet creep feed without antibiotics. Piglets were weaned at an average age of 5 weeks in accordance with current Swedish practice.

2.2. Studied animals

Before the sows entered the farrowing unit during the first study period, researchers assigned pens to treatments;

Table 1
Overview of animals and housing conditions on participating farms.

	Farm A	Farm B	Farm C	Farm D
Breed of sows	Swedish Landrace × Yorkshire	Swedish Landrace × Yorkshire	Swedish Landrace	Swedish Landrace × Yorkshire
No. of sows in herd	600	540	266	594
No. of sows in study	67	56	54	68
No. of litters in study	103	90	74	96
No. of piglets entering study	1328	1149	857	1240
Size of farrowing pen	6.4 m ² (2.0 × 3.2 m)	6.2 m ² (2.08 × 2.97 m)	6.0 m ² (1.97 × 3.07 m)	6.2 m ² (1.95 × 3.2 m)
Available free space for the sow	4.6 m ²	4.5 m ²	4.9 m ²	4.6 m ²
Type of solid floor	Concrete	Concrete	Concrete	Concrete
Type of slatted floor	Cast iron	Cast iron	Plastic	Cast iron
Slat width	11 mm	15 mm	18 mm	11 mm
Width and length of slot openings	11 × 200 mm	10 × 200 mm	11 × 95 mm	10 × 200 mm

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