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Turning around by pregnant sows

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ABSTRACT

Two experiments were conducted to investigate the effects of reducing pen width on turning around by sows. While pregnant sows were studied in both experiments, our overriding objective was to investigate the relationship between space on turning around by farrowing/lactating sows in pens and optimum pen dimensions. Thus, the use of pregnant sows was for our convenience and to avoid unnecessary disruption of lactation in sows and litters. In the first (pilot) experiment, 30 pregnant sows were placed individually in a test pen for 3 min to record the incidence of sows turning around (i.e. through 180°) at decreasing pen widths. While all 30 sows turned around in the 1.2 m wide pen, six turned around at 0.9 m and only one sow turned around at 0.8 m. No sows turned around at the 0.7 m width.

In the second (main) experiment, the posture and orientation of 20 individually housed pregnant sows were measured in a test pen (4.0 m × 2.4 m). Subsequently, each sow was exposed to a sequential reduction of pen width in seven steps/treatments: (1) 2.4 m, (2) total length of sow, and (3) 90%, (4) 80%, (5) 70%, (6) and (7) 50% of total sow length. Sows were introduced to the test pen one week before observations started and each treatment period lasted four days. The sows were video recorded during the last two days of each treatment period and sow posture (lying, sitting and standing/walking) and orientation relative to the pen walls were scored using instantaneous sampling at 15 min intervals. In addition, the number of turning movements in which the sow rotated her orientation through an axis perpendicular to the long walls of the pen, and attempts to turn around (incomplete turns), were recorded. Time spent lying and sitting did not increase significantly until pen width was reduced to 50% of sow length. The perpendicular orientation was most often observed in the widest pen and was rarely observed when pen width was 70% of sow length or less. The frequency of turning movements decreased from almost 200 times per 24 h in the 2.4 m wide pen to less than 36 times at pen width 60% of sow length and less than twice at 50% of sow length. All sows turned around several times daily, even when pen width was reduced to 60% of sow length. However, when pen width was reduced to 50%, only 7 of 16 sows turned around. We conclude that sows were able to turn around at a pen width equalling 50% of body length and that lying time was not affected until pen width was reduced to 60% of body length. However, since a decrease in the number of turns was already evident when pen width was equivalent to sow body length, the data suggest that pen width should never be less than this measure.

1. Introduction

Most animal welfare regulations support the concept that the minimum space requirement for non-confined sows should be sufficient to enable the sow to turn around, that is, to reorient their body through 180° (e.g.

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Council Directive 2001/88/EC). The minimum requirement for sows to turn around is of interest in several situations in commercial housing systems. For example, in farrowing/lactation accommodation, both the Ottawa crate (Fraser et al., 1988) and the ellipsoid pen/crate (Lou and Hurnik, 1994; Bradshaw and Broom, 1999) are examples of very small, modified farrowing crates in which the space needed to turn around sets the lower limit for the space allowance. The same principle is also the basis for the width of the passages in loose housing systems for dry sows.

When given a choice, sows prefer a farrowing crate width that enables them to turn around both before, during and after parturition (Phillips et al., 1992). In farrowing pens for individual loose-housed sows, a narrow nest-site adversely affected pre-farrowing behaviour and had a negative impact on sow and piglet behaviours related to piglet survival (Cronin et al., 1998). Further, when the sow has difficultly turning around in the farrowing pen, she may be less aware of the location of the piglets. This may be relevant to piglet survival. For example, prior to descent from standing to lying, sows that are unable to turn around completely (i.e. through 180°) or partially (i.e. with limited ability for turning the shoulders and head) may have less opportunity to observe the location of their piglets, potentially increasing the risk of piglets being trampled or overlain.

McFarlane et al. (1988) showed that when the distance between the pen walls in flared gestation crates increased from 112 cm to 122 cm, the average number of turns performed by the sows increased from 8.6 to 12.9 per day. Experience from commercial pig production suggests that small gilts are able to turn around even in conventional (0.6 m wide) gestation crates, and thus there might be a large variation in space (crate/pen width) needed to turn around. While some information exists about the minimum pen width to permit sows turning while concomitantly minimizing pen space, there are no data on how frequently sows turn around when space is sufficient.

Two experiments were conducted to identify the minimum pen width required to enable commercial sows to turn around and to investigate the effects of reducing pen width on the frequency of turning around, body position and general activity of single-housed dry sows. Dry sows were studied in both experiments in preference to lactating sows. This was done partly for our convenience but mainly to avoid unnecessary disruption of lactation in sows and litters. Nevertheless, our overriding objective was to investigate the relationship between space on turning around by farrowing/lactating sows in pens and optimum pen dimensions.

2. Materials and methods

2.1. Experiment 1 (pilot trial)

Thirty Large White × Landrace sows in mid-gestation were selected from available breeding herd sows at the Pig Research and Training Centre, Werribee. The sows had been housed in groups of two to five animals since the week after mating. There were three primiparous sows and 27 multiparous sows, and each was individually identified by an ear tag. On the day of testing, the group was removed from their pen, and each sow was weighed and measured. Sow length from the tip of the snout to the rump was estimated using a rod (19 mm diam. hardwood dowel), which had a right angle bracket (30 mm × 50 mm hardwood, 250 mm long) attached to one end. The right angle bracket was gently placed against the rear of the sow, adjacent to the tail, and the experimenter estimated the length of the sow from a tape measure glued to the top surface of the wooden rod. The measurement was conducted twice per sow and the mean of the two estimates was calculated as the estimate of sow length. Mean sow live weight was 217.9 ± 31.1 kg (range 155–296 kg) and mean sow length was 174.0 ± 10.1 (range 155–194 cm).

The group of sows was then placed in an empty pen adjacent to the test area which contained a custom-built test pen measuring 2.5 m long by 1.2 m wide. The test pen was constructed to enable the width of the pen to be modified in 0.1 m increments between 0.9 and 0.7 m. The test pen contained front and rear gates for entry and exit of sows, and one side was hinged to facilitate quick release in case a sow became stuck during turning around. Individual sows were placed in the test pen in a series of tests. To enter the test pen, sows were required to walk over a small pile of sow feed placed on the floor at the entrance to the pen. Sows were required to walk over the small pile of feed to ensure they knew that feed was located behind them. Feed was provided as a standard stimulus to motivate sows to turn around. The stockperson moved the sow into the pen and closed the gate. The sow's behaviour was observed by two experimenters, situated 3 m from the test pen, who scored the outcome of the test as either: the sow turned around (i.e. through 180° to reach the feed) either 'easily' (defined as in a single turning movement) or 'with difficulty' (defined as the sow required more than one turning movement to complete the rotation), or did not turn around but either appeared to be 'trying to turn' or 'not trying to turn'. At the end of each test, defined as either the sow turning through 180° or after 3 min, the sow was removed from the test pen and the pen width was adjusted according to a predetermined schedule of widths.

Sows were tested one at a time between 13:00 and 15:00 h, with one group of sows tested per day. For the initial test, pen width was 1.2 m. All sows could turn around at this width. Subsequently, each sow was tested at a pen width of 0.9 m (test 1), 0.8 m (test 2) and 0.7 m (test 3), respectively. Between each test however, the pen width was expanded to 1.2 m and the sow was placed in the pen to reinforce that she could turn around through 180°.

2.2. Experiment 2

A total of 20 pregnant Norwegian Landrace × Yorkshire sows (five primiparous and 15 multiparous) from the University Herd of Norwegian University of Life Sciences were randomly allotted to the experiment. The sows were housed in groups of six in pens with feeding cubicles. Total length of each sow (the tip of the snout to the rump) was measured three times using the same method as described in Experiment 1, and the mean of these measures was