

Behaviour and Productive Performance of Pregnant Sows According to the Housing System

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Abstract. The study aimed at evaluating the welfare of pregnant sows housed in individual and collective boxes, in an intensive farming system, by monitoring their behaviour, assessment of their productive performance and measurement of some physiological and health indicators. The research has been conducted on pregnant sows (n: 60) of Landrace x Great White breed, during their entire pregnancy. The animals were housed in collective pens featuring continuous flooring (A) and in individual boxes featuring discontinuous flooring (B). The resting behaviour was obvious from the first to the last week of pregnancy for the B lot (38-60%) compared to only 40% in lot A. In the case of A lot, the high variations of time spent resting were due to the sows' age. The aggressive behaviour was displayed within the A lot to an extent of 1.19%, while the B lot showed bar biting behaviour almost throughout the entire pregnancy period. Laminitis cases recorded with the A lot represented 1.9% compared to 3.7% with the B lot, while skin lesions accounted for 6% in the A lot compared to 3% in the B lot. The weight of the pregnant sows has increased with time spent resting and decreased time allotted to locomotion.

Different indicators must be used in assessing the pregnant sow welfare, depending on their housing system.

Keywords: pregnant sows, housing, welfare indicators

INTRODUCTION

European legislation concerning pigs protection imposes housing of pregnant sows in collective pens starting 2013, reason for which all farmers must change or improve the housing methodology of their pregnant sows.

During intensive farming the pigs are subject to constant stressful procedures generated by different activities. The negative implications of long-term exposure to painful situations are often obvious in the critical animal production and reproduction stages, as they are threatening and negatively impact the animals' welfare.

In their studies, De Wood-Gush et al. (1990), have shown that sows prefer displaying social contacts and interact in a friendly manner with the other individuals rather than aggressively. This is valid as long as their housing space is sufficient and their environment appropriate. Other researchers (Edwards et al. 2007), have shown that if sows are housed collectively, their welfare may be affected either because of fear and anxiety inducing interaction or because part of their behavioural responses to stress may be to stop displaying their normal behaviour. All these are clearly dependant on the group size and the way pens are built.

Poor animal welfare is due both to their inability to control the interactions with the environment they live in and the direct negative effects of lack of resources by means of their physiological mechanisms (Courboulay et al. 2007, 2009).

Our research has monitored the way the individual and collective housing system has influenced the welfare of pregnant sows, by assessment of behaviour and productive performance as well as measurement of some health and physiological indicators.

MATERIALS AND METHODS

The research has been carried out on confirmed pregnant sows (n: 60) of Landrace x Great white breed, which have been monitored during two production cycles, in each of the three stages of gestation (early, middle and late gestation). The sows were housed in individual and collective boxes on the same commercial farm, in different shelters, as the farm was undergoing a modernizing process. In order to be easily monitored, the animals participant in the study were identified by a marker spray when they were weighed for the first date.

Depending on the housing methodology, the animals were grouped in two lots: the A lot (n: 30), pregnant sows housed in collective pens featuring continuous flooring and the B lot (n: 20), pregnant sows housed in individual boxes featuring discontinuous flooring. The housing surface was allotted depending on the housing type: A lot (2.10 m²/sow) and B lot (1.20 m²/sow). The boxes had the same feeding and drinking facilities, and feeding was done on age and production specific recipes while water was supplied freely.

Four individual boxes and four collective boxes were monitored during the day using a video recording system, and after that by direct observation for 20 minutes, three time daily. The behavioural displays monitored were: resting, locomotion, feeding, aggressiveness and other (lying down, walking, socializing). The time duration used by the sows to express resting, feeding, moving and aggressive behaviours were added up and rendered in percentages of the recorded time.

Skin lesions were assessed depending on their presence and protuberance (0 – small scratches) or presence (1 higher scratches and 2 parallel scratches), while laminitis cases were evaluated as present or absent. All of these were observed at distance of approximately 0.5 m from the animal all the time.

The statistical data analysis included the t test in order to be able to compare the behavioural displays, the skin lesion and laminitis occurrence in animals participant in the study, and as well as the standard deviation, in order to highlight their average weight in the two types of boxes.

RESULTS AND DISCUSSIONS

The locomotion behaviour display was higher in the A lot during the first week following mixing (45.9%) and during the last pregnancy week (28.02%), compared to only 15.56% within the B lot (Tab.1).

We have associated the locomotion behaviour to fear in some animals in a new environment, or when people appeared (B lot) and it was very obvious in animals newly introduced in the group (A lot). Increasing resting time was compensated by corresponding decrease in moving time in both lots. Variations in resting and locomotion time were due to differences in age of sows and their housing.

Recorded aggressive behavioural displays were higher with the A lot (2.78%), compared to only 1.32% with the B lot (in the early and late gestation). Stressful events triggered animal insecurity and aggressive behaviours both in lot A and B.

Tab.1

Behavioural manifestations (%) of pregnant sows

Gestation month/ Behavioural manifestations time (%)	Early gestation		Middle gestation		Late gestation	
	A lot	B lot	A lot	B lot	A lot	B lot
Resting	33.87	38.40	45.36	50.65	42.12	60.32
Locomotion	45.9	16.30	31.29	17.46	28.02	12.94
Feeding	11.01	13.23	11.29	11.61	9.8	11.04
Aggressiveness	2.78	1.32	0.74	1.91	0.06	1.12
Other	6.44	30.75	11.31	18.36	20.00	14.58

The appearance of such behaviour was considered normal only in the case of the A lot, as it falls under normal adaptive animal behaviour, while with the B lot the behavioural displays were considered abnormal, as they correspond to abnormal behaviour (e.g. bar biting).

In 2001 Reeves stated that limiting the exposure to pain and suffering inducing risks might achieve a reduction in aggressive behavioural manifestations. This in turn can be achieved by periodical inspection and at the same time, appropriate fodder, water and housing conditions for each animal so that the sow is able to display normal behaviour. Are also very important, adequate group dynamics and formation correlated to the system and animal needs.

The research data have shown that when the animals were not given the opportunity to move, explore the environment or manipulate the occupational materials their welfare was affected in the B lot. This data have also been correlated to the high number of laminitis cases and skin lesions. The occurrence of lesions was high in A lot sows compared to the ones in the B lot (Tab.2)

Tab.2

Skin lesions (%) of pregnant sows

Skin lesions score	A lot	B lot
0	95.88	94.5
1	4.90	2.9
2	1.02	0.6

The results have shown that skin lesions are predominant in A lot (6%), compared to only 3.5% within the B lot. Some of these lesions have appeared in the A lot in the first week after mixing, during social aggressions, following fight to take place at the feeding gutter or when new sows were introduced in the boxes, while with the B lot these skin lesions were mostly due to the housing floor, not in the least comfortable, as well as to the animals' manifest boredom, displayed by repetitive bar biting almost throughout their entire pregnancy period.

In 1993 De Koning used skin lesion measurement to assess the animal welfare, as an indicator of the multifactorial quality relationship of the animals to their environment.

When the pregnant sows are housed in groups, the group must be as stable as possible and a solution to avoid aggressive displays from the animals would be the presence of occupational materials in the boxes in sufficient supply. These materials may be used by the sows in certain situations as visual barriers, which would allow them to hide from potential aggressors (Barnett et col., 2001). Moreover, the supply of equipment, which would ensure

easy feeding for all animals, may be another solution to decrease the displays of aggressive behaviour within the group.

The laminitis cases in pregnant sows (Tab.3) have represented a useful indicator of health condition as well as a poor welfare one, and were predominant in the B lot (3.7%) compared to only 1.9% in the A lot. A periodical monitoring activity is subsequently necessary in this case in order to identify the main risk factors, which might generate such diseases.

Tab.3

Lameness (%) of pregnant sows in the different houses

Lameness	A lot	B lot
Absent	98.1	96.3
Present	1.9	3.7

The incidence of lameness varied within the shelters of the same farm, thus indicating the important influence in managing housing conditions in collective boxes (lower) and individual boxes (higher). The numerical evaluation of laminitis cases makes up for an adequate instrument in assessing the housing floor for pregnant sows in farms and it is necessary to use it in order to compare different housing systems as well as individual private farms. The method is easily applied in practice and immediately renders the animals welfare and health condition.

The newly introduced sows (A lot) to the groups with a low social status have shown a lower average weight (Fig.1) in early gestation (181.2 ± 0.81 kg) compared to the ones individual boxes (184.6 ± 0.9 kg). They had to spend more time to display their behaviour and were restricted from feeding.

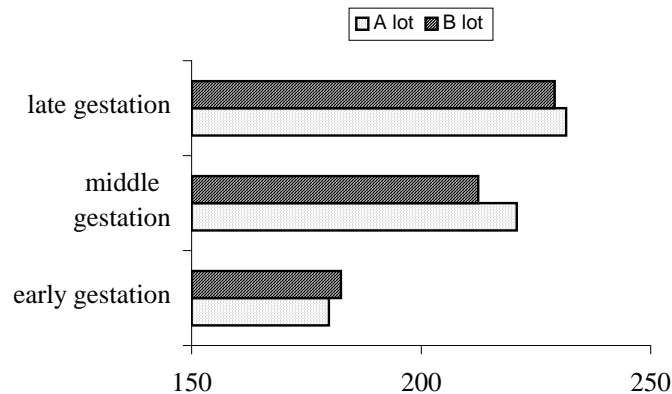


Fig. 1. Average weight (kg) of pregnant sows

The results suggest that the sow's welfare is negatively affected by the low social status in both cases. Rada et col. (2009) state in one of their studies that maintenance of sows in individual boxes with a rigorous control of fodder consumption quantity would allow an increase in sow performance upon delivery and weaning.

The sows' behaviour and health condition, should be correlated to their body weight, and duly processed, and they may be used in order to correct some production technological parameters.

CONCLUSIONS

The sows housed in collective pens were able to better express their natural behaviour which determined a better health condition with a lower incidence of skin lesions and laminitis cases compared to the sows housed in individual boxes.

Keeping the pregnant sows in collective pens ensures a full welfare of the animals provided that: the boxes are equipped with occupational materials, the group stays relatively stable and sows return to the same group following delivery, and animal mixing is carefully managed.

Formation and group dynamics must match the system and animal needs – that is of pre-mixing of the sows should be performed.

If severe signs of fighting appear, the causes must be immediately investigated and the appropriate measures to prevent them must be taken.

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