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FARROWING CRATES INFLUENCE ON THE CHANGE OF THE SOWS POSITION, SUCKING OF THE PIGLETS AND THEIR DEATH BY CRUSHING

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Summary

Some farrowing accommodation systems in intensive pig breeding may, with the existing microclimatic conditions in the houses influence the sows behaviour and loss of piglets by crushing. Thus we intended this research to test the effect of comfort in some farrowing crates on the sows change of position frequency, the number of sucking and the loss of piglets by crushing. Thirty sows in their second farrowing, of the Swedish Landrass breed, were divided in to three groups and placed in three different farrowing crates. The first group was put in a house with farrowing crates (size 2.2 x 1.6 m, paralel restriction for the sow was 0,60 m) with grated floor (House A); the second group was in farowing pens 3.0 x 1.8 m without restriction for the sow and with full floor, bedded with in straw which was changed every 5th day (House B) and the third group was in farrowing crates (size 2.0 x 1.5 m; with diagonal restriction for the sow of 0.50 m) with full floor without bedding (House C). The change of their position and the influence thereof on the piglets' sucking were monitored by video cameras during the first, tenth and twentieth day of their stay in the farrowing crates. Each animal was filmed, during the research period, for 6 hours (08:00 till 14:00). By looking at the film and by statistical processing of the results it was established that narrow restrictions and unfavourable microclimatic factors in House C influenced significantly ($P<0.05$) the frequency of position changes in comparison with other houses. A more frequent change of position resulted in an increased number of short or interrupted suckings,

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so that the piglets in House C had, during the research, a statistically significant difference ($P<0.05$) in the increased number of suckings in comparison with the other houses. The suckings were either short or interrupted, so that the piglets were constantly hungry, their progress was slow and they were crushed more frequently. Accordingly, in such accommodation conditions one may expect significantly lesser production results as well as loss of piglets by crushing, more than 40 percent of total losses of piglets while sucking. Thus we come to the conclusion that a wider space for the sow as well as optimal microclimatic factors and modification in the farrowing crates with straw, may decrease the changing of position frequency and in this way influence the sucking quality, the piglets vitality and a decrease of losses caused by crushing.

Key words: farrowing crates, change of the sows' position, number of sucking, crushing

Introduction

The loss of piglets during the breast feeding period represents the main problem in the intensive pig breeding. Most deaths during piglets first week of life and crushing may cause the greatest loss of piglets (Svendsen et al., 1986; Dyck and Swiestra, 1987; Bradshaw and Broom 1999). Kunz and Ernst (1987) report that crushing was the cause of 47.4 % of all live born piglets losses, while Krsnik et al., (1996) state that, taking all losses of piglets whill sucking, 37.8% were caused by crushing. In order to decrease the sucking piglets mortality, specially that caused by crushing farrowing crates with restricted space were introduced in to intensive breeding. These crates were constructed so that they make it difficult for the sow to make bigger movements, thus making the floor area of the sow safe for the piglets (Wechsler and Hegglin, 1997). Such narrow space in the farrowing crates, however, may, on the other hand, make the sow restless as an indicator of her discomfort (Herskin et al., 1998). This is mostly shown by the frequent change of the sows' position, a clumsy lying down and, thus, crushing the piglets (Wechsler and Hegglin, 1997). Owing to this in the last few years several researches have been devoted to better understanding of the sow's behaviour in various types of farrowing accommodation (Fraser and Thompson, 1986; Thompson and Fraser, 1986: McFarlane et al., 1988;

Curtis et al., 1989, Blackshaw et al., 1994; McGlone et al., 1994; Wechsler and Hegglin, 1997; Lou and Hurnik, 1998; Harris and Gonyou, 1998) whereby most have been found far from the ideal in regard to animal welfare. The present considerations lead to finding alternative farrowing systems, characterised by less space restriction with improvement in the sows' comfort in the farrowing crates (Herskin et al., 1998). The crates should be evaluated on the basis of the sows' behaviour, the microclimatic factors in the house, the sucking frequency and the loss of piglets by crushing.

Materials and Methods

The research included 3 groups of 10 sows each, all in their second farrowing, of the Swedish Landrace breed, placed in three different farrowing houses. The first group of sows was put in the house with farrowing crates (size 2.2 x 1.6 m; with parallel restriction for the sow of 0.06 m) and with grated floor (Object A), the second group was in the farrowing crates of the size of 3.0 x 1.8 m, without restriction for the sow and with full floor, bedded with straw which was changed every 5th day (House B), while the third group was in the farrowing crates (size 2.0 x 1.5 m; diagonal restriction per sow of 0.50 m) and with full floor without bedding (House C). In all the three research cycles the microclimatic factors were measured (temperature, relative humidity, air circulation rate) by the multipurpose device Testo 400 (Germany). The microclimatic factors' measurement was done every two hours during the research days.

Each sow with piglets was filmed by a wide-angled video camera, put outside the farrowing area. In this way all the piglets and the sow were easily identified. Each single sow in the research was filmed on the first, the tenth and the twentieth day for six hours (08:00 till 14:00). By subsequent analysis of each photograph, the observer noted every change in the sow's position as described by Götz (1991) as well as the sucking of piglets, as defined by Fraser (1980).

The dead piglets and the sows that participated in all research cycles, were separated and weighed. The death diagnosis owing to crushing was based on the body injury and visible contusions in the head, breast and stomach area with characteristic pathomorphological lesions (blood haematoma under the skin and abundant bleeding in body cavities). Besides, some corpses looked flattened and the tongue was protruding from the mouth cavity.

The basic statistical processing was carried out in accordance with the SAS program (1999). The results obtained regarding the frequency of the sows' change of position as well as the number of piglets' sucking were processed by the one direction variance analysis (ANOVA), while the microclimatic measurements and the death of the piglets were represented as mean values.

Results

The results of the research regarding the sows' change of position, the number of piglets' sucking, the microclimatic conditions and the piglets' loss in Housse A, B and C during the research, are shown in Tables 1, 2, 3, and 4.

Table 1. - RESULTS OF THE ONE DIRECTION VARIANCE ANALYSIS FOR THE SOWS' CHANGE OF POSITION IN HOUSE A, B, AND C DURING 1st., 19th AND 20th DAY OF THE PIGLETS LIFE

Conditions	1.N = 10* House A		2.N = 10* House B		3.N = 10* House C	
	Mean	SD	Mean	SD	Mean	SD
Day 1	14.1^{a}	6.06	19.8^{b}	4.85	28.6^{c}	2.84
Day 10	22.4^{a}	3.02	23.9^{a}	3.73	34.5^{b}	2.80
Day 20	22.8^{a}	3.04	24.5^{a}	3.66	43.5^{b}	4.70

^{a,b,c} = mean values in the same row with different letters differ on the P< 0.05 level

* Number of animals in the group

Table 2. - RESULTS OF THE ONE DIRECTION VARIANCE ANALYSIS FOR THE NUMBER OF SUCKING IN THE HOUSES A, B, AND C, ON THE 1st, 10th, AND THE 20th DAY OF THE PIGLETS' SUCKING

Conditions	1.N = 10* House A		2.N = 10* House B		3.N = 10* House C	
	Mean	SD	Mean	SD	Mean	SD
Day 1	6.6^{a}	1.65	10.2^{b}	1.32	14.8^{c}	2.70
Day 10	6.7^{a}	1.06	11.9^{b}	1.79	20.1^{c}	4.28
Day 20	11.9^{a}	1.10	16.60^{a}	2.91	26.6^{b}	3.13

^{a,b,c} = mean values in the same row with different letters differ on the P< 0.05 level

* Number of animals in the group

Table 3. - AVERAGE MICROCLIMATIC VALUES IN HOUSES A, B, AND C ON THE 1ST, THE 10TH, AND THE 20TH, DAY OF THE PIGLETS' SUCKING

Conditions	House A			House B			House C		
	T	ah	w	T	ah	w	T	ah	w
	^{0}C	%	m/s	^{0}C	%	m/s	^{0}C	%	m/s
Day 1	21,5	75	0.2	21	74	0.2	24	81	0.2
Day 10	21	74	0.2	20	74	0.2	26	82	0.2
Day 20	21	75	0,2	21	74	0.2	26	82	0.2

Table 4. - TOTAL NUMBER OF LIVE BORN PIGLETS AS WELL AS TOTAL LOSSES AND DEATHS BY CRUSHING

Sow's Litter from the Farrowing Crates	Number of live born piglets	Total losses of the live born piglets	Detahs by crushing
A	96	19	3 (16.01%)
B	102	16	2 (12.5%)
C	98	24	10 (41.7%)

Discussion

The results obtained point to the fact that, with growing of the piglets the frequency of the position changing and the number of suckings as well increase in all houses. In that, the highest number of the position changing and the highest number of piglets' sucking during the 1st, the 10th, and the 20th, day was observed in the farrowing crates with narrow space and full floor (House C). A statistically significant difference ($P<0.05$) in the increased position change frequency during the research in House C, in comparison with the other Houses, may be connected with the increased temperature, the relative air humidity and narrow space. Owing to these factors, the sows were rather restless and often stood up in order to lie down again. Such type of behaviour caused, in accordance with the viewed photographs, the incomplete breast feeding phenomenon as described by Whatson et Bertram (1980) and, accordingly, a constant hunger in the piglets. The breast feeding was interrupted by the sow's standing up and taking the sternal position, showing thus an increased discomfort when compared to the sows in other houses, this being in conformity with the research carried out by Herskin et al., (1998). As soon as the sows took one of the side positions, the piglets, in most cases, would immediately try to suck. Owing to this fact the piglets in House C had a

significant difference ($P<0.05$) with regard to increased number of suckings in comparison to other Houses. The frequent change of the position in House C may have caused an increased number of crushing in this House. Owing to such frequent interruption of sucking the piglets were weaker and, accordingly, slowler in their reactions to the sow's movements, or they did not react at all - a fact also reported by Svedsen et al., (1986) and Fraser (1990). In our research there were even 41,7% of deaths owing to crushing. The lower number of crushed piglets as well as less frequent change of position and number of suckings in House A, with a wide space and in House B with farrowing crates and full bedded floor, may be attributed to more spacious accommodation and the sows adapting to the change of the environment was helped by the straw which may have changed the sows behaviour thus increasing the piglets survival rate, the fact also reported by Cronin et al., (1994). Besides, the straw, may produce a warning for the piglets to withdraw from the sow when she moves. Thus we come to the conclusion that a wider space for the sow, optimal microclimatic conditions and adding straw to the farrowing crate may affect, in a positive way, the physical well-being of the sow and thus, also, indirectly, the sucking duration and a decreased rate of piglet crushing.

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UTJECAJ PRASILIŠNIH BOKSOVA NA PROMJENE POLOŽAJA KRMAČA, SISANJE PRASADI I UGINUĆA ZBOG PRIGNJEČENJA

Sažetak

Pojedini smještajni sustavi za prasenje u intenzivnom svinjogojstvu mogu uz postojeće mikroklimatske prilike u objektu utjecati na ponašanje krmača i gubitke prasadi zbog prignječenja. Stoga je istraživanje osmišljeno radi testiranja učinka udobnosti pojedinih prasilišnih boksova na učestalost promjene položaja krmača, broj sisanja i gubitke prasadi zbog prignječenja. Trideset krmača drugopraskinja pasmine švedski landras bilo je podijeljeno u tri skupine i smješteno u tri različita prasilišna boksa. Prva skupina krmača bila je smještena u objektu s prasilišnim boksovima (veličina 2,2 x 1,6 m; paralelno uklještenje za krmaču 0,60 m) i rešetkastim podom (objekt A), druga skupina u prasilišnim oborima (3,0 x 1,8 m bez uklještenja za krmaču) i punim podom koji je svaki 5. dan steljen slamom (objekt B), a treća skupina u prasilišnim boksovima (veličina 2,0 x 1,5 m; dijagonalno uklještenje za krmaču 0,50 m) i punim podom bez stelje (objekt C). Promjene tjelesnih položaja i njihov utjecaj na sisanje prasadi snimani su video kamerama tijekom prvog, desetog i dvadesetog dana boravka u prasilištu. Snimanje svake pojedine životinje u razdobljima istraživanja trajalo je 6 sati (08:00 do 14:00). Pregledom video snimaka i statističkom obradom rezultata utvrđeno je da uska uklještenja i neodgovarajući mikroklimatski čimbenici u

objektu C signifikantno utječu (P< 0,05) na povećanu učestalost promjene tjelesnih položaja u odnosu na ostale objekte. Češća promjena položaja uzrokovala je povećan broj kratkih ili prekinutih sisanja, zbog čega je prasad u objektu C tijekom istraživanja imala statistički signifikantnu razliku (P< 0,05) za povećan broj sisanja u odnosu na ostale objekte. Sisanja su bila kratka ili prekinuta, zbog čega je prasad gladovala, slabo napredovala i bila češće prignječena. U takvim smještajnim uvjetima mogu se očekivati znatno manji proizvodni rezultati i gubici prasadi zbog prignječenja veći od 40 posto ukupnih gubitaka prasadi za vrijeme sisanja. Zaključujemo da šire uklještenje za krmaču, optimalni mikroklimatski faktori i modificiranje prasilišnih boksova pomoću slame može smanjiti učestalost promjene tjelesnih položaja i na taj način utjecati na kvalitetu sisanja, vitalnost prasadi i smanjenje gubitaka zbog prignječenja.

Ključne riječi: prasilišni objekti, promjena položaja krmača, broj sisanja prasadi, prignječenja

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