

**BEHAVIOUR OF BREEDING SOWS
24 HOURS BEFORE WEANING****B. Krsnik, Irena Petak, D. Konjević, T. Balenović****Summary**

A number of 30 sows of different age and breed composition, accommodated in farrowing crates with piglets aged 27-28 days were observed, 24 hours before weaning. The partitions bars were removed from one side of the crate at 8th to 10th day after farrowing. Five sows' body positions were observed (lying on the left side, on the right side, on stomach, the sitting position and the standing position). Statistical analysis showed differences between the observed sow groups regarding the duration of the lying position on the right side (the 1st group differed from the 2nd, 3rd and 4th, while there was none for the 5th and 6th group) and the sitting position (only group 2 and 3 differed). The sows were lying for a shorter period of time than the sows with suckling piglets and spent longer time in the sitting and standing position. Sitting was the dominant position of all noted positions, while the remaining observed activities (drinking, urinating, sniffing, rooting, scratching) were only short and happened, mostly, before and after feeding. It would be convenient to enable the sows some space where they can remove from the piglets when they wish to do so, improving thus to their welfare and, although, earlier return of the sow to estrus would, enable a more successful production.

Key words: behaviour, sows, weaning

Introduction

Under the natural conditions the weaning of piglets is a gradual process and the piglets are weaned in the age of 14 to 17 weeks (Jensen, 1986; Newberry and Wood-Gush, 1988; Jensen and Recén, 1989).

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In the intensive breeding the sows are kept in the farrowing crates in order to diminish the possibility to crush the piglets and to prevent the sow to remove from the piglets so that she is not able to stop the piglets approaching the udder (P i t t s et al., 2002). When the sow was given the possibility to remove into another place where there were no piglets, sudden change, from staying most of the time with the litter to staying most of the time without it, was observed, while the moment this change occurred varied from the 1st till the 5th day, or a week (B ø e, 1991; P a j o r et al., 2000).

The share of sucking, motivated by the sow's voicing, decreases with time (J e n s e n and R e c é n, 1989; B ø e, 1991). K r s n i k et al. (1996a, 1996b, 1996c) found that the share of sucking, motivated by the sow's voicing, increased from the 1st till the 10th day of the piglets' age and it decreased on the 20th day.

In the last decades the weaning moment in the intensive breeding has only been determined by the production parameters - so, for instance, T e B r a k e (1976) is of the opinion that it is favorable for the production to wean the piglets when their weight reaches 20 kg, that is, at the age of 21 to 25 days. This process happens earlier than it would happen in the natural conditions and it is also sudden, thus causing also sudden changes in the environment, feeding and social surroundings (Cox and Cooper, 2001). On the other hand, C r o n i n and al. (1991) suggest that lactation should not be longer than 28 days, owing to the increase of the cortisole in the blood of the sows accommodated in such a way. We observed the behaviour of the sows with piglets aged 27 to 28 days. On the basis of sows behaviour we tried to determine whether their stay with the piglets of that age caused unrest in the sow, taking into consideration the way they were kept, or whether there was a certain attachment of the sows to their piglets and the weaning was going to be a "violent event".

Materials and Methods

We were observing 6 groups of sows, five in each group, a total of 30 individuals. Chosen sows were of different breed and age. They were kept with the piglets till the age of 27 and 28 days, in farrowing crates without straw. The crate was 175 cm in the length and 250 cm in the width, divided by two partitions. The sow was within the partitions. The partitions bars were removed from one side on 8th to 10th day after farrowing, thus enlarging the sow's space.

The sows were fed regular meals and drank water from the automatic watering troughs. On the right hand side of the box, at the height of 6 cm from the floor, was a gas heater for the piglets. The ventilation was executed by a fan.

Before the observation the sows had to get used to the observers. The observations were executed in five-minute-intervals, during 24 hours. The following behaviour patterns were observed: lying down, standing, eating, drinking, urinating, sitting, biting, rooting and scratching. The observed data were statistically processed (variance analysis and Tukey HSD test) and presented graphically.

Results

The research results are shown in three tables and two graphs. Table 1, 2 and 3 show the results of the statistical data processing. Graph 1 presents the data regarding the positions the sows were taking and graph 2 their activities during 24 hours before weaning.

Graph 1. - SHARE OF EACH POSITION EXHIBITED BY SOWS 24 HOURS BEFORE WEANING

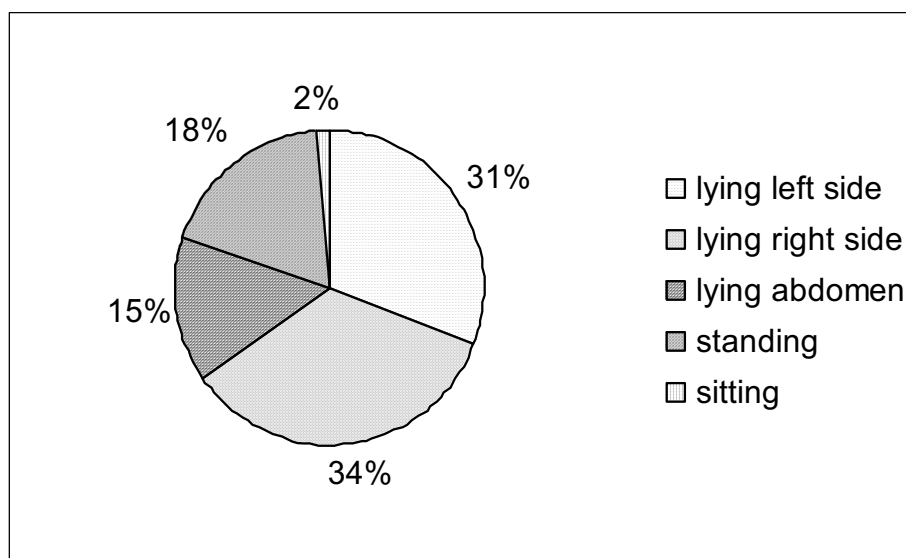


Table 1. - COMPARISON OF THE POSITION AND ACTIVITY DURATION OF 6 SOWS' GROUPS 24 HOURS BEFORE WEANING

Positions and activities	Group												
	I				II				III				
	$\bar{x}\pm Se$	sd	x_{min}	x_{max}	$\bar{x}\pm Se$	sd	x_{min}	x_{max}	$\bar{x}\pm Se$	sd	x_{min}	x_{max}	
lying	left side	469±61.42	137.34	357	695	399±36.61	81.86	300	485	458±20.97	46.90	402	530
	right side	380±56.69	126.76	180	510	551±26.88	60.11	470	617	504±17.63	39.41	442	531
	abdomen	291±50.76	113.50	160	429	191±19.32	43.20	125	239	208±20.11	44.96	157	258
	total	1140±10.42	23.31	1117	1171	1141±27.93	62.44	1075	1206	1170±6.50	14.54	1153	1184
	standing	280±13.17	29.46	247	310	266±28.17	62.99	198	340	260±6.69	14.96	245	277
	sitting	20±4.80	10.72	13	39	33±7.69	17.19	15	56	11±1.44	3.21	8	15
	eating	154±10.81	24.18	125	189	125±15.30	34.22	70	162	150±9.00	20.13	126	175
	drinking	5±0.95	2.12	2	8	4±0.89	2.00	2	7	5±0.51	1.14	3	6
	urinating	2±0.20	0.45	2	3	1±0.24	0.55	1	2	2±0.24	0.55	1	2
	biting	17±2.08	4.66	14	25	16±3.23	7.23	8	26	17±1.24	2.77	14	21
	rooting	37±8.05	17.99	16	62	62±16.34	36.53	15	99	61±5.14	11.50	51	80
	scratching	5±1.26	2.83	2	8	4±1.38	3.08	2	9	7±1.32	2.95	2	9

	Group												Analysis of variance	
	IV				V				VI				F	p
	$\bar{x}\pm Se$	sd	x_{min}	x_{max}	$\bar{x}\pm Se$	sd	x_{min}	x_{max}	$\bar{x}\pm Se$	sd	x_{min}	x_{max}		
	407±28.87	64.57	319	475	462±16.81	37.60	426	519	474±16.68	37.30	424	518	0.944963	0.470264
	557±19.67	43.98	512	624	480±12.26	27.42	443	503	493±7.68	17.17	465	510	5.099534	0.002518
	202±31.66	63.31	153	292	203±10.11	22.60	178	234	194±13.64	30.50	147	222	1.949754	0.124791
	1176±17.43	38.97	1128	1220	1145±11.21	25.06	1107	1174	1160±18.76	41.94	1114	1220	0.846346	0.530552
	247±19.03	42.56	198	298	270±9.36	20.94	244	299	254±19.38	43.35	193	301	0.467900	0.796285
	17±1.66	3.70	13	22	25±2.40	5.36	21	34	26±1.77	3.96	20	30	3.802130	0.011187
	156±10.64	23.80	128	182	157±9.99	22.33	126	181	156±10.33	23.09	130	188	1.212439	0.333498
	4±0.86	1.92	2	7	4±1.02	2.28	2	7	5±0.97	2.17	2	8	0.287179	0.915443
	2±0.32	0.71	1	3	2±0.37	0.84	1	3	2±0.37	0.84	1	3	1.185185	0.345665
	12±1.66	3.70	7	16	17±0.97	2.17	14	20	14±2.42	5.40	9	23	1.002320	0.437626
	40±7.96	17.81	15	61	55±4.85	10.84	46	73	56±6.21	13.88	35	73	1.384501	0.265228
	5±1.25	2.79	2	8	6±0.71	1.58	4	8	5±1.08	2.41	2	7	0.765012	0.583986

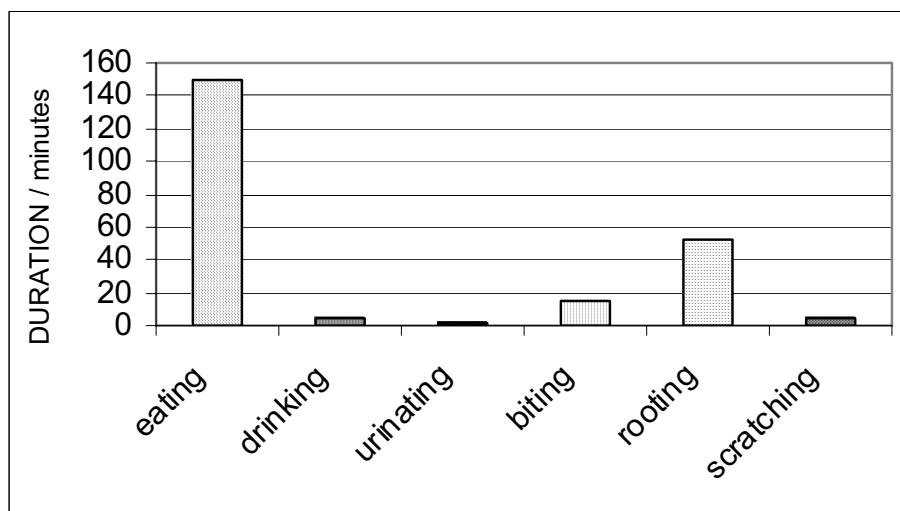
Table 2. - TUKEY HSD TEST OF THE "LYING ON THE RIGHT SIDE" VARIABLE

GROUP	{1}	{2}	{3}	{4}	{5}	{6}
	M=379.60	M=551.20	M=504.00	M=556.60	M=479.80	M=492.80
G_1:1 {1}		0.003301	0.049639	0.002407	0.165625	0.088816
G_2:2 {2}	0.003301		0.844330	0.999993	0.498119	0.695410
G_3:3 {3}	0.049639	0.844330		0.777306	0.989890	0.999756
G_4:4 {4}	0.002407	0.999993	0.777306		0.419793	0.613880
G_5:5 {5}	0.165625	0.498119	0.989890	0.419793		0.999496
G_6:6 {6}	0.088816	0.695410	0.999756	0.613880	0.999496	

Table 3. - TUKEY HSD TEST OF THE "SITTING POSITION" VARIABLE

GROUP	{1}	{2}	{3}	{4}	{5}	{6}
	M=20.000	M=33.000	M=10.600	M=17.200	M=24.800	M=26.200
G_1:1 {1}		0.232486	0.567231	0.995918	0.954778	0.877709
G_2:2 {2}	0.232486		0.006835	0.092679	0.696752	0.830924
G_3:3 {3}	0.567231	0.006835		0.847369	0.159889	0.099511
G_4:4 {4}	0.995918	0.092679	0.847369		0.757737	0.610846
G_5:5 {5}	0.954778	0.696752	0.159889	0.757737		0.999863
G_6:6 {6}	0.877709	0.830924	0.099511	0.610846	0.999863	

Graph 2. - PRESENTATION OF THE DURATION OF ALL SOWS' ACTIVITIES 24 HOURS BEFORE WEANING



Discussion

During the morning hours, before the arrival of the workers, the sows were mostly lying down. All other activities were short. The entry of the workers and putting the light on did not disturb the sows - which was not the fact, however, when the feeding trolley was brought in or when the crates were being cleaned.

In our research, with sows accommodated together with their piglets, in crates with one partition, we registered 5 positions and 6 activities.

After the bars from one side of the crate were removed on the 8th and 10th day, the sows were given a generally greater possibility to choose the place where they wished to lie down. They were mostly lying down next to the wooden box partition wall, while lying down next to the partition bars and lying down in the middle of the box and diagonally was observed as well.

The positions observed with our sows were lying down on the left side, the right side, on the stomach and standing up. Those positions were also observed by other researchers with sows before farrowing (K r s n i k and Y a m m i n e, 1992) and after farrowing (K r s n i k et al., 1996d; 1996e; 1997, 2002), while L o u and H u r n i k (1996) state only 4 positions as they did not distinguish between the left and the right side.

The positions were changed more frequently during daytime and in the early afternoon. The changes were, most probably, caused by the sows' personal necessity and the piglets' activity.

Statistical analysis showed a difference between the six observed groups of sows regarding the duration of their lying down on the right side and sitting position (Table 1).

The further analysis, presented in Table 2, shows a statistically significant difference between the first group when compared to the groups 2, 3 and 4, while none were observed for the groups 5 and 6. The duration of the sitting position (Table 3) in all 6 sow groups showed a statistically significant difference only between the 2nd and the 3rd group.

It is actually rather hard to establish the reason for this difference between the sows. However, this could be attributed to the place chosen for lying down, the piglets' activities, their age, the weight and the breed of the sow.

If we observe the sows as a whole, we may note that the lying down position was 34% on the left side, 31% on the right side, 15% lying on the stomach and 18% standing, while sitting had a share of 2% (Graph 1). K r s n i k et al. (2002) were observing the sows on the first day after farrowing and found that their dominant position was lying down (on the stomach and on the left or right side) - 93% of the observation time. In this research this was observed with 80% of the observation time. Thus, regardless of the fact that sows were in

crates, they spent 20% of their time, on the 27th/28th day standing up, a fact caused by the piglets' activity, or sitting down, a position representing an in-between-position between standing up and lying down. This may show the wish of the sow to remove herself from the litter, or to decrease the number of sucking times. In the intensive system, the sow cannot increase the distance between herself and the piglets during the lactation period so the piglets are for most of their time concentrated on the sow (they chew her ears, her snout, her bristles, tail, vulva etc.). As an answer to such molestations of the piglets, the sow "suddenly grabs" a piglet (W h a t s o n and B e r t r a m, 1982/1983). The frequency of such sow's behaviour in the research of C r o n i n et al. (1991) increased suddenly on the 28th day of the piglets sucking time period. In our experiment no such behaviour of the sows was observed, but they were obviously restless.

Activities observed with the sow were eating, drinking, urinating, biting, rooting and scratching - the behaviour corresponding to the behaviour repertoire before and after farrowing (K r s n i k and Y a m m i n e, 1992; K r s n i k et al., 2002). With all six groups of sows no statistical differences for such activities were found (Table 1). Thus, taking the fact into consideration that the sows differed by their breed, age and number of farrowings, one may come to the conclusion that this form of behaviour is determined by the environmental conditions, as this was identical to all observed animals, as well as by the personal needs of the sow and the demands made by the piglets.

Bringing in the food trolley caused rising of the sows and when the food was distributed, the sows approached the fence and pushed their heads through the fence, smacking their teeth, biting objects, some voicing intensively, some scratching, rooting, sniffing, drinking water or urinating. These activities were not of long duration and were mutually exchanged. After the food was distributed the eating duration differed from sow to sow. Some sows interrupted their meal in order to let the piglets suck for a while and then went back to their food. After feeding, some sows were lying down, sitting or standing, passively looking for possible leftovers.

In our research the main observed sows' activity was eating (Table 1). W e a r y et al. (2002) observed the sows enabled to remove themselves from their litter to a separate space when they desire to do so and those who were not able to, observing the fact that those who were not able to remove themselves from the piglets fed less. When the sows are given the possibility to remove themselves from their litter, a more natural lactation course is thus made possible, the time they spend with their litter decreases as well as the amount of milk necessary for the piglets' growth and, accordingly, the weight of the sow (P i t t s et al., 2002) so that they return to estrus more quickly (W e a r y et al., 2002). This suggests the fact that in our research the sows

tried, by prolonging their eating habits, to compensate for their lost weight, or decrease their unrest caused by the piglets' sucking demands. Snout rooting is also connected thereto because it represents a behaviour connected to the pigs' feeding habits (F r a s e r, 1980). In our research the rooting places were most frequently observed in the region of the water-trough, the relieving places and lying down places.

Object biting, in our research, the third activity when compared to the length of its duration, coming immediately after eating and rooting (Table 1), was observed, with most of the individuals, during the distribution of food. Otherwise, such behaviour belongs to the oral stereotypes and is the reflection of an impoverished environment (F r a s e r, 1975), but can also be interpreted as a frustration of a kind, caused by the restricted area animals are in.

Scratching, drinking water and urinating were, with our sows, short-lasting behaviours. Scratching is a comforting behaviour, observed in the ethogram of the pigs kept in a semi-natural environment with only 1% of time (S t o l b a and W o o d - G u s h, 1989).

In our research urinating was observed as short-lasting (Table 1), possibly connected, pursuant to the P a j o r et al. observations (2000), to an additional stress caused by the impossibility that they may relieve themselves outside of the region they are lying down.

One should also mention the fact that, before weaning, the sows do not receive their midday meal, causing an additional unrest in the animal, but also the appearance and the change of the behaviour as presented on Tables 1, 2 and 3.

Conclusion

A great number of authors collected a lot of information regarding the sows' welfare based on the observation of their behaviour. In this research the positions and behaviour habits observed were the same as normally seen in the sows kept in the described way. The pattern of the behaviour, however, was different. The sows spent 20% of their time standing or sitting. The main sows' activity was eating, a fact which may be interpreted as an attempt to compensate for the energy lost by sucking, or an attempt to decrease their unrest caused by the piglets' sucking demands and thus they were more active. Accordingly, one should recommend such types of technological solutions when accommodating sows in the future, where the sows are given the possibility to leave the box with their litter and thus remove themselves from the piglets for as much time as they want. By doing this, one would increase

the sow's welfare and the earlier return to the estrus would be achieved, improving in this way the production cycle as well.

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VLADANJE KRMAČA 24 SATA PRIJE ODBIČA

Sažetak

Promatrano je 24 sata prije odbića 30 krmača, različite starosti i pasminskog sastava, smještenih u bokseve s prasadi starom 27-28 dana. Krmače su raskliještene 8. do 10. dana nakon prasnjenja, kod čega je bila skinuta jedna pregrada. Praćeno je 5 položaja (ležanje na lijevom boku, desnom boku, trbuhu, sjedenje i stajanje) i 6 aktivnosti krmača (jedenje, pijenje, uriniranje, grizenje predmeta, rovanje i čohanje). Statistička analiza je pokazala razlike između šest promatranih grupa krmača u trajanju položaja ležanja na desnom boku (razlika prve grupe od 2., 3. i 4., dok je nema za 5. i 6. grupu) i sjedenja (razlika samo između 2. i 3. grupe). Krmače su ležale kraće nego što to leže krmače s mladom prasadi, te su duže sjedile i stajale. Od uočenih aktivnosti dominantno je bilo jedenje, dok su ostale uočene aktivnosti (pijenje, uriniranje, njušenje, rovanje, čohanje) bile kratkotrajne i događale su se uglavnom prije i nakon hranjenja. Poželjno bi bilo omogućiti krmačama prostor u koji bi se mogle odvojiti od prasadi kada to žele, čime bi se povećala njihova dobrobit, a ranije vraćanje krmača u estrus omogućilo bi i uspješniju proizvodnju.

Ključne riječi: vladanje, krmače, odbiće

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