THE COMPARISON OF THE BEHAVIOUR OF WEANERS HOUSED AFTER MIXING IN PEN EQUIPPED WITH A HANGING TOYS: OBJECT FOR BITING AND WOODEN BALL

PORÓWNANIE ZACHOWANIA WARCHLAKÓW UTRZYMYWANYCH PO ODSADZENIU W KOJCACH WYPOSAŻONYCH W PODWIESZANE DODATKOWE ELEMENTY: GRYZAKI I DREWNIANĄ PIŁKĘ

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ABSTRACT

The behaviour of weaners after mixing housed in pens equipped with hanging flexible, destructible object for biting, hanging non-destructible wooden ball and without enrichment was evaluated. It was found that both enrichments reduced aggression, however the most interesting for weaners was the object for biting.

Keywords: behaviour, weaners, aggression, environmental enrichment

STRESZCZENIE

Przeprowadzono obserwacje zachowania warchlaków utrzymywanych po odsadzeniu w kojcach wyposażonych w podwieszane elastyczne, odkształcające się gryzaki, podwieszaną drewnianą piłkę oraz bez elementów dodatkowych. Stwierdzono, że dodatkowe wzbogacenie środowiska chowu zarówno w postaci gryzaków jak i podwieszanej drewnianej piłki spowodowało obniżenie poziomu agresji, jednak najbardziej interesujące dla warchlaków okazały się gryzaki.

Słowa kluczowe: zachowanie, warchlaki, agresja, wzbogacenie środowiska

DETAILED ABSTRACT (in Polish)

Wzbogacanie środowiska chowu świń jest wymagane przez regulacje prawne Unii Europejskiej. Problem stanowi jednak określenie jakimi cechami powinny się charakteryzować elementy dodatkowe, by zaspokoić potrzeby behawioralne świń. Przeprowadzono 24-godzinne obserwacje zachowania 144 warchlaków w okresie 3 dni po odsadzeniu i ponownie po 3 tygodniach od odsadzenia. Warchlaki pochodzące z dwóch miotów łączono ze sobą w każdym z 8 powtórzeń i następnie dzielono na 3 grupy: grupa I – kontrolna (6 warchlaków w powtórzeniu) utrzymywana w kojcu zaścielonym słomą o wymiarach 1.5 x 2,2 m, grupa II – doświadczalna (6 warchlaków w powtórzeniu) utrzymywana w identycznym kojcu wyposazonym w zabawkę – gryzaki na metalowym stelażu, podwieszone u sufitu, grupa III – doświadczalna (6 warchlaków w powtórzeniu), utrzymywana w identycznym kojcu z podwieszona u sufitu drewniana piłką. Nie stwierdzono statystycznie istotnych różnic w całkowitej aktywności pomiędzy grupami. Statystycznie istotne różnice stwierdzono natomiast w odniesieniu do zachowań agonistycznych. Największą ich częstotliwość obserwowano w grupie utrzymywanej w kojcu bez elementów dodatkowych. Na podstawie uzyskanych rezultatów można stwierdzić, iż możliwość odkształcania, przeżuwania i ewentualnego zniszczenia (cechy reprezentowane przez gryzaki) czynią zabawkę dla świń bardziej atrakcyjną, pomagając prawdopodobnie we wcześniejszym ustaleniu zależności hierarchicznych.

INTRODUCTION

Weaning is a very stressful event often associated with vigorous fighting, growth check and digestive disorders [13]. It is a critical period for the piglets with respect to both nutrition, change from milk to solid food, and social behaviour, separation from the sow and mixing with piglets from other litters. At this time, the piglet is very susceptible to disease because of its immature digestive and immune functions. Modern production systems therefore seek to meet the needs of the weaned piglet by providing a high quality diet, an appropriate thermal environment and a high standard of hygiene [1].

In commercial conditions pigs of similar ages and weights are usually mixed with unfamiliar animals, resulting in considerable aggressive behaviour [5]. Housing pigs in barren environment often leads to behavioural disorders e.g. stereotypies which may reflect in productive results.

The results obtained by Merlot et al. [10] show that social mixing was perceived as a stressful event, because the increased salivary cortisol level was found. The most intensive aggression occurs during the first 1-2 h after which it steadily decreases to a very low level by 24-48 h post grouping and within a given group size the amount of fighting increases with the number of unfamiliar pigs within the pen [8]. Environmental enrichment introduced into and underlined by EU regulations (Commission Directive 2001/93/EC) [4] may improve the barren conditions and may appease behavioural needs [11]. The problem is how to recognize the features of the enriching objects which would satisfy pigs' behavioural needs. In opinion of Lewis et al. [9] the properties of a substrate determine whether or not it will be successful as a source of environmental enrichment. However the destructibility and flexibility are widely accepted as material characteristics which are relevant to pig toys [9]. Van de Weerd et al. [16] suggest that these objects should be chewable, ingestible, deformable, and destructible. The choice of enrichment for pigs should not be arbitrary, but should take into account the requirements of the animals. If these conditions are not fulfilled the animals may lose interest in additional objects [6].

Information presented above induced us to compare the behaviour of newly-mixed weaners housed in pens equipped with hanging toys: chewable, deformable and destructible biting object and non-destructible hanging wooden ball.

MATERIAL AND METHODS

24 hour behavioural observations of 144 Polish Landrace x Polish Large White crossbred weaners during 72 hours after weaning which took place at 35 day after farrowing (first observation period) and again 24 hours after three weeks from weaning (second observation period) were carried out. The experiment was made in 8 repeats. In each repeat the weaners were mixed from two litters and divided into 3 groups:

Group I (6 weaners in round) housed in a standard pen, 1.5 m (width) x 2,2 m (length) covered with plenty of straw

Group II (6 weaners in round) housed in the similar pen covered with plenty of straw equipped with hanging biting object constructed of ropes and plastic tubes fixed to the oval metal rack, the whole biting object was fixed to the ceiling

Group III (6 weaners in round) housed in the similar pen covered with plenty of straw with the hanging wooden ball, fixed to the ceiling

The pigs were fed ad libitum. Each pig was individually marked using waterproof chalk, what enabled the identification of initiator of subsequent behaviour. The 24 hour behavioural profile of both groups was evaluated

including the activity phase: agonistic behaviour (fighting and biting), fighting frequency, eating duration and eating frequency, interest in enriching object - duration, frequency of interest in toys (in group II and III) as well as the resting phase including lying on the side, lying on the belly and sitting. The obtained behavioural data was marked on the previously prepared ethogram and statistically analyzed using Kruskall-Wallis test.

RESULTS

Among all days of observation the longest activity duration was found during first 24 hours in all investigated groups (Tab. 1). It was connected with very active exploration the new environment, rooting and sniffing. During first three hours most of the fights was observed. The duration of fights as well as the fighting frequency were the lowest in pen with an object for biting, however the differences were not statistically significant. The eating time was similar in all observed groups but statistically significant differences were noted in eating frequency between weaners housed in pen with a biting object and a pen equipped with hanging ball, where the eating frequency was the lowest. Worth noting is the fact that during all days of observation the most attractive was the biting toy and the interest in it increased gradually to the third observation day. The sequence of interest in both toys was as follows: firstly one or two individuals sniffed the enriching object, after that more pigs became interesting in additional object. Very interesting is that in all days of observation, in case of an object for biting, pigs lied down near the place where it was fixed while in case of a hanging wooden ball the place for lying was chosen rather randomly. Moreover, the animals after shorter or longer resting phase drank the water and then ate food. Every weaner before lying down rooted in straw and then lied down.

During second observation day the statistically significant differences were found in case of fighting frequency (the lowest in weaners housed with an object for biting and the highest in weaners without any toy), interest in toy frequency (the highest in the group housed with an object for biting) and eating frequency (the highest in group of weaners housed in pen equipped with an element for biting).

On the third observation day the similar relations were found. The duration of fights as well as the fighting frequency were still on the lowest level in weaners housed in pen with fixed toy for biting. The longest duration of interest in toy was found also in this pen. The frequency of interest in that toy was statistically significantly higher than the frequency of that behaviour observed in weaners housed in pen with a wooden ball. Eating frequency differed statistically significantly between pen equipped with the hanging wooden ball (the lowest value) and a pen without a toy (the highest value).

After three weeks the further decrease of activity in all groups was found. The fighting frequency as well as the duration of fighting behaviour also decreased in comparison to the first observation period. It is worth noting that the average fighting frequency was lower in groups of weaners housed with the presence of enriching objects, however it was not confirmed statistically. Still high interest in a biting object in comparison to the hanging wooden ball was found during second observation period.

DISCUSSION

Weaners show aggressive behaviour leading to injuries and stress when unfamiliar animals are mixed. Typically, most aggressive interactions are shown during the first few hours after grouping [2, 8]. Group size has little effect on the number of aggressive interactions following introduction [1]. After mixing the probability of fight happening, the duration and intensity of the fighting as well as the speed of group integration is influenced by the level of aggressiveness of the individual pigs. This is the reason why the aim of the environmental enrichment is not only to enable the wide spectrum of behaviour but to be attractive for pigs and to absorb pigs' mind. The interactive effect of the enriching object features (e.g. chewable, destructible, odorous) rather than independent influence can contribute to the success of a pig toy. The results obtained by Pearce and Paterson [14] showed that toys such as chains, shreds tyres significantly increased exploratory behaviour, but did not affect the total activity duration. Own researches in some degree confirm these findings, because the interest in a biting object was more intensive in subsequent days, however, the total activity was not affected. Low number of tail and ear biting (below 1%) found in enriched environment found also Van de Weerd [17]. Such a decrease was also obtained in previous preliminary experiment by Nowicki and Kopyra [12]. In our, present experiment the most attractive for pigs was a destructible, chewable, deformable biting object, however the decrease of aggression was also found in pen equipped with hanging wooden ball. Some of the data show that additional objects reduce "social pressure" by redirecting aggression [11]. Although there is also the risk that very attractive toys can may provoke competition. Blackshaw et al. [3] put the attention on the diffrence between hanging and free toys and found that free toys can be soiled by faecals and become less

Table 1. Behavioural profile of weaners housed in pen with biting object, hanging wooden ball and without a toy (24 h = 100%)

Tabela 1. Zachowanie warchlaków utrzymywanych w kojcu z gryzakami, podwieszaną drewniana piłką i bez elementu dodatkowego (24 h = 100%)

Behaviour Zachowanie	Subsequent days of observation (1 = day of weaning) Kolejne dni obserwacji (1= dzień odsadzenia)	Housing System utrzymania		
		Pen equipped with an object for biting Kojec wyposażony w gryzak	Pen equipped with a hanging wooden ball Kojec wyposażony w podwieszoną drewnianą piłkę	Pen without a toy Kojec bez elementu dodatkowego
Eating (%) Czas jedzenia (%)	1	4.05	3.06	3.43
	2	4.11	2.63	4.30
	3	3.18	3.13	6.35
	21	3.26	3.85	6.88
Eating frequency Częstotliwość jedzenia	1	17.22a	11.75a	13.20
	2	15.76a	9.15a	14.61
	3	11.35	7.08a	14.10a
	21	12.20	12.56	14.39
Duration of fighting (%) Czas trwania walk (%)	1	0.13	0.15	0.20
	2	0.16	0.25	0.26
	3	0.10	0.23	0.53
	21	0.07	0.09	0.07
Fighting frequency Częstotliwość walk	1	6.32	7.12	7.35
	2	2.30a	5.85	8.13a
	3	2.10a	2.16b	6.25ab
	21	1.04	1.20	1.18
Interest in toy (%) Zainteresowanie zabawką (%)	1	0.68	0.31	-
	2	1.30a	0.41a	-
	3	1.42a	0.50a	-
	21	0.54	0.32	-
Interest in toy frequency Częstotliwość zainteresowania zabawką	1	6.20a	3.60a	-
	2	7.78a	4.65a	-
	3	6.45a	2.65a	-
	21	1.40	1.14	-
Total activity (%) Całkowita aktywność (%)	1	34.52	32.05	32.53
	2	24.56	22.80	22.75
	3	23.26	20.05	25.03
	21	20.38	19.35	21.23
Total resting (%) Odpoczynek (%)	1	65.48	67.95	67.47
	2	75.44	77.20	77.25
	3	76.74	79.95	74.97
	21	79.62	80.65	78.77

Means in rows signed the same letters differ statistically significantly (P<0.05)

attractive for pigs. However, Scott et al. [15] found that manipulation of Bite-Rite object (plastic cone with four protruding plastic chewing arms) as well as straw bedding decreased over time, although this trend was not significant in case of straw. The effect of straw presence was not investigated in the present study but interest in biting object increased within first three days while in case of non-destructible hanging wooden ball it fluctuates during that time and the alterations were rather small.

The total feeder occupancy time per day, was lower (approximately 10 minutes) than that behaviour observed by Hyun et al. [7] but in their researches they investigated fatteners starting from about 27 kg. However, the frequency of eating (number of feeder visits) was very similar to observed during 21 day in own experiment (approximately 12). Higher values obtained directly after mixing may result from the fights near feeder as well as from the smaller stomach dimensions, so the feed had to be taken in smaller portions.

In conclusion it should be stated that the possibility of chewing, destructibility and deformability make a toy for pigs more attractive probably helping to establish the social hierarchy earlier, although the object not featured with these traits can also shorten the time of agonistic behaviour.

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