Biological Forum – An International Journal **15(5): 618-623(2023)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Farrowing Behaviour of Crossbred Pigs Reared Under Two Accommodations

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(Received: 09 March 2023; Revised: 16 April 2023; Accepted: 18 April 2023; Published: 20 May 2023)
(Published by Research Trend)

ABSTRACT: 12 female crossbreed pigs (Hampshire × Tenyivo) in the genetic ratio of 75:25 at the age of 42 days each were reared in two different accommodation, i.e., (Group 1, T_1) group accommodation and (Group 2, T_2) individual accommodation under standard management conditions for 28 fortnights. With the aim to determine the effect of rearing space for the animal welfare in terms of farrowing behaviour. The result for time spent on different activities in farrowing behaviour revealed that there was no significance difference in the behaviour for pawing, straw, biting, grunting, straining. However, there was significant difference in rooting behaviour. The duration of rooting was significantly ($P<0.01$) higher in group accommodation with the mean value of 19.65 and 18.44 for T_1 and T_2 group respectively. Furthermore, the effect for frequency on different activities in farrowing behaviour revealed that there was no significance difference in the behaviour for pawing, rooting, straw, biting, grunting, and straining. From the results, it can be concluded that different types of accommodation in the crosses of Hampshire × Tenyivo with the ratio of 75:25 has affect on time spent for rooting behaviour.

Keywords: Group accommodation, individual accommodation, pawing, rooting, straw, biting, grunting, straining, crossbreed pigs, different housing, Hampshire, Tenyivo, animal welfare.

INTRODUCTION

Pig rearing in India is common to tribal people of Northeast region and piggery is an important integral part of the livelihood of the people (Patr *et al.*, 2014). Pig accommodation had been designed to protect pigs and give them the most ideal environment for growth and production (Dominguez, 2020). Animal behaviour expressed individually or collectively has an obvious and composite functioning. Learning and knowing the animal behaviour enables farmers and experts to develop better production system to provide comfort to livestock and efficiently utilizes the domesticated animals to serve men (Bhat *et al.*, 2010). Several studies have evidently provided the advantages and disadvantages for group accommodation and individual accommodation system in pigs. In individual housing, the animals demand separate supervision and intensive care. It enables the animal to feed at its own space and it further allows the ration to be regulated according to the animal need. The major throwback of this system is that it has an adverse influence on attainment of puberty as well as libido. On the contrary group housing confinement enhances attainment of puberty and libido (Ramesh *et al.*, 2015). The animals in the individual housing are not forthcoming and are mostly hassled while attaining the animal for different factors whereas the group housing pigs are pleasant to handle and cooperates while attaining the pigs for various farm factors. A larger area may be more proficient for pigs health and welfare, however the financial considerations need to be factored in as well (Zeng *et al.*, 2022). The health and welfare (HW) of pigs can affect behaviour and performance (Jordi *et al.*, 2021). Competition at the feeder, social facilitation, and social stress are all factors that may be responsible for the differences in feeding behaviour and production parameters between group housed and individually housed pigs. Social facilitation in group housed pigs results in synchronised feeding, but can lead to increased competition for feeder space in pigs kept in groups, caused by the motivation to feed simultaneously. Therefore, a balance between the amount of competition and the amount of social facilitation that occurs in a group situation must be found if the maximum food intake is to be achieved (Hisa and WoodGush 1983). The accurate selection of accommodation conditions that are best suitable for the physiological status of breeding females is one of the key in optimizing their reproductive efficiency. In sows, the preference for either separation from

herd mates or maintaining group interactions are atavistic, meaning relating to or characterized by reversion to something ancient or ancestral (Cucchi *et al*., 2011).

There are some careful recommendations in the scientific literature describing the design for the sow group housing in order to decrease aggression (Arey and Edwards, 1998; Barnett *et al*., 2001). The legislative, consumer and retailer forefront the concern on animal welfare so there is pressure to enhance the use of group housing; however on the contrary the international industry has experienced that group housing is limited due to high levels of aggression among the newly formed groups of pigs after gathering them in a space. (Verlarde, 2007). The European Union has already passed legislation to ban individual gestation stall in 2013.Keeping the above facts in view, the present research work entitled "Farrowing behaviour of crossbred pigs reared under two accommodations" was postulated to see the effects of different accommodation on crossbreed pig in Nagaland.

MATERIALS AND METHODS

A total of 12 crossbred female (Hampshire × Tenyivo) in the genetic ratio of 75:25 at the age of 42 days were selected from the pig farm of Livestock Production and Management Department, Nagaland University, SASRD, Medziphema Campus, Nagaland. The farm is located at 93.20°E to 95.15°E longitudes and latitudes between 25.60 20 ° N to 27.4°N at an elevation of 310 meter above sea level. For this experiment, the 12 female pigs were divided into two groups of 6 pigs each, the first one was group housing system, where all the pigs were accommodated in a single sty and for second one that was individual housing system, all the 6 pigs were accommodated individually in six separate sties. The housing for both the treatments was concrete floors and the side walls of the sties were made of concrete material as well. The roof was made of CGI sheet of nine feet in height. All the pigs of both the treatment were fed conventional standard feeding system prescribed by ICAR (2013).

The farrowing behaviour was observed three (3) days prior to farrowing. The observation of this behaviour was engaged from 7:00 am to 5:30 pm for about in total of 10 hours. The gestation period of the pig is 114 days ± to which the animals can farrow on the day of the expected date or even after the expected date therefore a 3 days observation before the calculated date has been maintained not to miss out the farrowing behaviour. This farrowing behaviour was observed using a Closed Circuit Television (CCTV) camera which has been installed to all the sties for both the treatments. The farrowing behaviour was observed under:

(i) Pawing
(ii) Rooting
(iii) Straw
(iv) Biting
(v) Grunting
(vi) Straining

The six behaviours are nesting behaviour of sows shown normally when the sows are reaching for the parturition time. All the activities were observed under two categories:

1. Time spent in the activity
2. Frequency of the activity.

For pawing behaviour, some straw and a sack was provided to the sow to observe whether the nesting behaviour had commence through which the sow will try to gather the materials provided. Rooting is a natural behaviour in pigs, however prior to farrowing this particular activity can be elevated which is a normal sign of nesting behaviour and it was examined by when the pigs nudge or push into something repeatedly using its snout. For the observation of straw behaviour, the sow was provided with some straw and as the parturition period commence the sow starts to gather and rearrange the straw in a space to which the observation was noted. Biting behaviour indicates the sow is in pain, nervous or contractions while in nearing to parturition, the observation was recorded when the sow starts biting to anything that was available in its space. The grunting behaviour is like a communication, it is observed while the pig is either in contractions, discomfort or restless and it shows through sound, the observation for this behaviour was recorded when sow starts to make a distinctive noise as in grunting accompanied with its body language shown discomfort and restlessness. Straining behaviour was observed and recorded when the sow lied down on its side and displayed mild abdominal pull or pressure, this behaviour is usual when the sow is nearing to parturition like a sign of body under stress and experiencing pressure. The frequency of all the activities was recorded during the observation hours according to the quantity of times the sow indulge in that particular behaviour or activity. All the activities *viz*., pawing, rooting, straw, biting, grunting and straining was recorded by a Close Circuit Television (CCTV) Camera. The surveillances were then transferred to a pen drive for observation using a computer for both the treatments.

RESULT AND DISCUSSION

A. Time spent on different activities for farrowing behaviour

From the perusal of the data (Table 1), the activity for pawing was not observed on the first day, but on the second day 67.24 and 74.05 minutes for both the treatments were observed and on the third day 114.80 and 110.88 minutes were observed for T_1 and T_2 respectively. From the result, it was observed highest on 24 hr in sow behaviour, which was in agreement with Widowski and Curtis (1990) where their findings displayed a peak of pawing activity during the 24 h to 16 hr period pre-partum.

For time spent in straw, gathered from the data (Table 1), there was no observation on day one and two but on the third day 43.80 and 43.33 minutes were observed for T_1 and T_2 respectively. From the result it was observed highest on 24 hours prior to parturition which was in contrary with the findings of Hurnik (1994) who

reported that the activities of straw as for nest building were initiated 56 hr in gilts of group housing and 50.5 hr in gilts of individual accommodation before the start of farrowing process, it is used to do determine the occurrence of farrowing.

For time spent for Biting was observed only on the third day prior parturition, the values were 2 and 1.83 minutes for T_1 and T_2 respectively. Similarly, time spent for grunting was observed only on the third day, prior parturition and the values were 82.25 and 83.03 minutes for T_1 and T_2 respectively. Further, times spent for straining was also observed only on the third day, prior parturition and the values were 30.78 and 29.67 minutes for T_1 and T_2 respectively. The results were in agreement with the findings of English *et al*. (1982) who stated that sows grunting increased as farrowing had approached and sow may chew any available structure in the pen probably as a result of discomfort, nervousness and frustration. Jones (1966) reported that as farrowing approaches there was an increase in biting activity which is the prominent feature of restlessness; English *et al*. (1982) reported that abdominal contraction (straining) appeared in most cases two to three hours prior to birth of the first pig.

The result for time spent on different activities in farrowing behaviour revealed that there was no significance difference in the behaviour for pawing, straw, biting, grunting, straining. However, there was significant difference in rooting behaviour. The duration of rooting was significantly (P<0.01) higher in group housing with the mean value of 19.65 and 18.44 for T_1 and T_2 group respectively. Rooting is a natural behaviour of pigs. Although this behaviour was observed three days before the parturition, there was more prominent occurrence on the 24 hours before farrowing which was in agreement with the findings of Cronin *et. al*. (1993) who had observed that there was more rooting behaviour that occurred during 24 to 16 hr (P<O.OI) and the last 8 hr (P<0.05) pre-partum. Blackshaw *et al*. (1994) observed that the mean value for rooting behaviour was significantly higher in individual pen than group accommodation.

Table 1: Influence of accommodation on time spent of the activities in farrowing behavior.

Farrowing Behaviour	Period To Farrowing	Treatment		Remark
		T1	**T2**	**S/NS**
PAWING	**DAY 3**	114.80	110.98	NS
	DAY 2	67.24	74.05	NS
	DAY 1	0.00	0.00	NS
	MEAN	**60.68**	**61.67**	**NS**
ROOTING	**DAY 3**	25.82	24.68	NS
	DAY 2	22.78	21.47	NS
	DAY 1	10.33	9.17	NS
	MEAN	**19.65**	**18.44**	**S***
STRAW	**DAY 3**	43.80	43.33	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**14.60**	**14.44**	**NS**
BITING	**DAY 3**	2.00	1.83	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**0.67**	**0.61**	**NS**
GRUNTING	**DAY 3**	82.25	83.03	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**27.42**	**27.68**	**NS**
STRAINING	**DAY 3**	30.78	29.67	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**10.26**	**9.89**	**NS**

[a, b] means bearing different superscripts in a row differ significantly (P<0.05)

B. Frequency of the activities in farrowing behaviour

From the perusal of the data, (Table 2) for frequency of pawing was not observed on the first day but on the second day 3.50 and 4.50 times for both the treatments were observed and on the third day 6.67 and 5.40 times were observed for T_1 and T_2 respectively. For frequency of rooting it was observed on all the three days prior parturition, on the first day 3.50 and 3.50 times for both the treatments were observed, following on the second day 7.00 and 6.33 times for both the treatments were observed and on the third day 6.00 and 6.17 times were observed for T_1 and T_2 respectively. From the data analysis on different activities in farrowing behaviour it was observed that there was no significance difference in the values for frequencies for pawing and rooting. Contrary to this, Ramesh *et al*. (2002) found that duration and frequency of pawing and rooting activities has been observed to be significant (P<0.01) where their findings were related with the higher duration and frequency of pawing in enclosure accommodation might be consequent to the unsatisfied need of nesting behaviour (Hughes and Duncan 1988) and increased restlessness (Vestergaard and Hansen 1984) because of close confinement.

The result for frequency of straw was observed only on the third day, 5.83 and 6.17 times for both the treatments. The statistical analysis did not differ significantly, however the mean value in frequency for straw gathering activity was found highest on the 24 hr. This outcome was in agreement with observations of Ramesh *et al*. (2015) where showed significantly (P<0.01) highest value of straw gathering activity in duration and frequency during 24 hr than the previous two days in gilts of both the accommodations.

From the glance for the result for frequency of biting was observed only on the third day 1.33 and 1.17 times for both the treatments. Following for frequency of grunting was also observed only on the third day, 8.67 and 8.33 for both the treatments. From the result, it was perused that the values of frequency of biting and grunting were higher on 24 h before parturition, however statistically it did not differ significantly for both the treatments. The results of the present study were in agreement with the findings of Ramesh *et al*. (2015) who showed the escalation of biting and grunting activity from day 3 to day 1 and there were significant (P<0.01) differences in various types of accommodation for gilts. The present findings were also in agreement with the observations of English *et al*. (1982); Cronin *et al*. (1994) who reported that the grunting and biting increased with the approach of farrowing and there were a sign of restlessness, discomfort, nervousness and frustration which was more expressed by sows under confinement. This activity had been explained as the abnormal behaviour by Lammers and De Lange (1986) consequent upon unsatisfied needs.

From the glance of the data, the activity for frequency of straining was observed only on the third day of farrowing 1.83 and 2.00 for both the treatments. From the result, it was observed only few hours before the parturition which was less than 24 h. From the statistical analysis the values did not differ significantly. The result of present study were in agreement with findings of English *et al*. (1982), who had observed straining in term of abdominal contraction within 1-3 hr prior to the birth of first piglet. In addition to the result, the findings showed the mean value of frequency of straining was higher in individual accommodation which was in dissimilar with the findings of Ramesh *et al*. (2015) who observed that the frequency of straining was lower in individual pen.

Table 2: Influence of accommodation on the frequency of the activities in farrowing behavior.

Farrowing Behaviour	Period To Farrowing	Treatment		Remark
		T1	T2	S/NS
PAWING	**DAY 3**	6.67	5.40	NS
	DAY 2	3.50	4.50	NS
	DAY 1	0.00	0.00	NS
	MEAN	**3.39**	**3.30**	**NS**
ROOTING	**DAY 3**	6.00	6.17	NS
	DAY 2	7.00	6.33	NS
	DAY 1	3.50	3.50	NS
	MEAN	**5.50**	**5.33**	**NS**
STRAW	**DAY 3**	5.83	6.17	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**1.94**	**2.06**	**NS**
BITING	**DAY 3**	1.33	1.17	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**0.44**	**0.39**	**NS**
GRUNTING	**DAY 3**	8.67	8.33	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**2.89**	**2.78**	**NS**
STRAINING	**DAY 3**	1.83	2.00	NS
	DAY 2	0.00	0.00	NS
	DAY 1	0.00	0.00	NS
	MEAN	**0.61**	**0.67**	**NS**

[a, b] means bearing different superscripts in a row differ significantly (P<0.05)

CONCLUSIONS

The study was carried out to assess farrowing behavior of crossbred pigs reared under two accommodations. For this study 12 crossbred pigs were divided into two groups, where T1 was for group housing and T2 for individual housing. All the animals were reared under similar feeding regime and standard housing system. The average values of time spent for pawing recorded was 60.68 vs. 61.67 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were no difference among the T_1 group and T_2 group, irrespective of the treatments. The average values of time spent for rooting recorded was 19.65 vs. 18.44 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were significant (P<0.05) difference among the T_1 group and T_2 group. It can be interpreted that time spent for rooting was influenced

by the different types of accommodation. The average values of time spent for straw recorded was 14.60 vs. 14.44 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were difference among the T_1 group and T_2 group, irrespective of the treatments. The average values of time spent for biting recorded was 0.67 vs. 0.61 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were difference among the T_1 group and T_2 group, irrespective of the treatments. The average values of time spent for grunting recorded was 27.42 vs. 27.68 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were difference among the T_1 group and T_2 group, irrespective of the treatments. The average values of time spent for drinking recorded was 10.26 vs. 9.89 (min) in T_1 and T_2 group respectively. Statistical analysis revealed that there were difference among the T_1 group and T_2 group, irrespective of the treatments.

The average values for frequency of pawing recorded was 3.39 vs. 3.30 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. The average values for frequency of rooting recorded was 5.50 vs. 5.33 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. The average values for frequency of straw recorded was 1.94 vs. 2.06 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. The average values for frequency of biting recorded was 0.44 vs. 0.39 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. The average values for frequency of grunting recorded was 2.89 vs. 2.78 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. The average values for frequency of straining recorded was 0.61 vs. 0.67 (times) in T1 and T2 group respectively. Statistical analysis revealed that there were no difference among the T1 group and T2 group, irrespective of the treatments. From the results, it may be concluded that the farrowing behaviour for different types of accommodation in time spent on different activities and frequency on different activities had no effect in the behaviour for pawing, straw, biting, grunting, straining. However there was significant difference in rooting behaviour.

FUTURE SCOPE

1. To study different kinds of stress and its effects related to group accommodation and individual accommodation.

2 To study the agonistic behaviour, eliminative behaviour and explorative behaviour in different types of accommodation in pigs.

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How to cite this article: Jongpongrenla Jamir, V.K. Vidyarthi, M.C. Rutsa, Thejanuo Rio, Drusilla, Jishing Rengma and Naorem Diana Devi (2023). Farrowing Behaviour of Crossbred Pigs Reared Under Two Accommodations. *Biological Forum – An International Journal*, *15*(5): 618-623.