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Effect of restricted suckling on the growth performance of Hampshire piglets*

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ABSTRACT

Eighteen Hampshire sows with their litters were randomly selected and divided into three groups keeping similar parities and equal average body weight of dams and their piglets in each group from 4th week onwards such as unrestricted suckling (T1), 6 hours restricted suckling (T2) and 12 hours restricted suckling (T3) groups. All the animals were reared under standard feeding and management conditions. Weaning of piglets was done at 8th week of age. The average body weight of piglets at 8th week was 9.66±0.39, 10.48±0.19 and 12.00±0.22 kg in T1, T2 and T3 groups, respectively. The average daily body weight gain of piglets from 4th to 8th week of age was 0.139±0.01, 0.164±0.01 and 0.220±0.01 kg in T1, T2 and T3 groups, respectively. There was highly significant difference (P<0.01) among the suckling groups in respect of both body weight and daily body weight gain from 5th week onward. The average body weight and daily body weight gain of piglets in T3 group were significantly highest. The average body length was 46.16±0.75, 51.37±0.41 and 53.84±0.52 cm; heart girth was 46.96±0.82, 51.28±0.42 and 50.74±0.40 cm and height at wither was 31.82±0.30, 33.93±0.28 and 38.20±1.29 cm in T1, T2 and T3 groups, respectively at 8th week of age. Highly significant difference (P<0.01) of the body measurements was observed among the suckling groups from 5th week onward. All the body measurements were lower (P<0.05) in T1 group than the T2 and T3 groups. The overall correlation coefficient of body weight with body length (0.87), heart girth (0.88) and height at wither (0.67) was highly significant (P<0.01). The regression coefficient of body weight on body length and heart girth was also highly significant (P<0.01), but regression coefficient of body weight on height at wither was non-significant. There was difference (P<0.05) of average daily feed consumption among the suckling groups. The average daily feed consumption was higher (P<0.05) in T3 group (0.176±0.01 kg) than that of T1 (0.139±0.01kg) but it did not differ significantly from T2 (0.162±0.01kg). The average cost of feeding per kg body weight gain in piglets were worked out to be ₹ 25.12±3.46, 24.48±2.71 and 20.23±2.04 for T1, T2 and T3 groups, respectively. The present study revealed that restricted suckling improved the growth performance of Hampshire piglets and decrease the cost of feeding.

Key words: Cost of feeding, Growth, Hampshire, Piglets, Restricted suckling

Pig rearing is a common practice for almost every house hold of the tribal people in the North-Eastern Region (NER) of India. It plays an important role in the socio-economic life of the people. The people of this region are predominantly non-vegetarian and meat is an integral part of their meal in most of the families. As per 20th livestock census (2019), maximum pig population was found in Assam with 23.18 percent (2.1 million) of total 9.06 million pigs in India. The NER as a whole has about 46.68 percent of total pig population in the country. Under field condition pigs are mostly reared traditionally with little or no scientific interventions and innovations. A large number of piglets do not thrive up to their marketing

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age due to lack of scientific management practices by the local farmers. Attaining maximum numbers of piglets to the weaning age and subsequently to the marketing age are very essential for maximum pork production and profitable pig farming. Out of various management factors suckling pattern and weaning methods are very important tools for maximum survivability, early growth and development of piglets. The competition among the piglets during suckling time is one of the main factor influencing their growth and survivability. So, it is essential to provide standard starter ration with restricted suckling to meet up their nutritional requirements. Therefore, present investigation was carried out to study the effect of restricted suckling on the growth performance of Hampshire piglets.

MATERIALS AND METHODS

A total of 18 Hampshire sows with their litters were selected for the study. The animals were divided randomly and equally into three groups keeping similar parities in each group. The piglets were subjected to three different suckling schedule after 4th week of age such as T1- suckling was not restricted and piglets were kept whole day with their dams; T2- suckling was restricted for 6 hours and T3- suckling was restricted for 12 hours. In T2 and T3 group dams were separated from their piglets to restrict suckling for the specified period. Dams were permanently separated from the piglets at 8th week of age for complete weaning. The animals were reared under standard uniform management practices. The dams and piglets were fed as per BIS (1986) feeding standard. The concentrate ration were fed @ 2.5 percent of body weight twice daily at 10:00 am and 3:30 to the dam. The concentrate ration was composed of crushed maize-35, wheat barn-25, rice polish-13, ground nut cake-19, fish meal-5, mineral mixture-2.5 and common salt-0.5 parts. The piglets were provided with starter ration (CP-19.9% and ME-3114 Kcal/kg) twice daily *ad libitum* prepared with crushed maize-49.5, rice polish-7.5, ground nut cake-30, fishmeal-5, vegetable oil-5, mineral mixture-2.5 and salt-0.5 parts from 4th week onwards as per [4] recommendation. The body weight of individual piglet was recorded weekly from 4th to 8th week of age. Daily feed intake in terms of dry matter (DM) was calculated by deducting the quantity of left over feeds from the feed offered to the animals. Average DM of starter ration and left over feeds was 90 and 70 percent respectively. The body length, heart girth and height at withers were measured with the help of measuring tape as per standard methods. The experimental data were analyzed as per GLM procedure of SAS Enterprise guide 4.2.

RESULTS AND DISCUSSION

Body weight of piglets

The mean body weight of piglets in different treatmnt groups have been furnished in Table 1. Analysis of variance revealed that there was highly significant difference ($P<0.01$) of body weight among the treatment groups at all the age groups. Significantly highest body weight was recorded in T3, while the lowest was recorded in T1 group at all the weeks. The average weight of the male piglets was found to be apparently more than female piglets at different ages. Previous authors[3&13] also reported higher body weight in restricted or intermittent suckling piglets than unrestricted suckling piglets. Some other workers[1&18] reported higher body weight in male piglets during pre-weaning period. The mean body weight of piglets found in the present study was in agreement with[7,10&15] in different breeds of pigs. But, two scientists[1&17] observed lower mean body weight of piglets at 8th week of age. The variations of mean body weight of piglets might be due to different weaning age, difference in breed, ration composition, management practices and the agro-climatic factors. In the present study, highest mean body weight in T3 group than other two groups might be due to more feed consumption along with sufficient suckling by the piglets in spite of 12 hours restriction. It indicated that restricted suckling might have not affected daily total milk consumption, because suckling during night hours was enough. Moreover, it might have provided an opportunity to consume more starter ration during day hours.

Table 1. Mean body weight (kg) of piglets in different treatment groups

Age (Week)	T1	T2	T3
4th	5.76±0.14	5.88±0.10	5.84±0.12
5th	5.99±0.17[a]	6.78±0.13[b]	7.27±0.12[c]
6th	7.11±0.23[a]	7.81±0.14[b]	8.38±0.16[c]
7th	8.22±0.32[a]	8.93±0.16[b]	10.16±0.16[c]
8th	9.66±0.39[a]	10.48±0.19[b]	12.00±0.22[c]
Total body weight gain	3.91±0.30[a]	4.59±0.15[a]	6.17±0.25[b]
Daily body weight gain	0.139±0.01[a]	0.164±0.01[a]	0.220±0.01[b]

Means with different superscripts within a row differ significantly.

Body weight gain of piglets

The mean body weight gain of piglet from 4th to 8th week was 3.91±0.30, 4.59±0.15 and 6.17±0.25 kg and mean daily weight gain was 0.139±0.01, 0.164±0.01 and 0.220±0.01 kg for group T1, T2 and T3 groups, respectively (Table 1). The body weight gain during entire period and daily body weight gain showed difference (P<0.01) among the suckling groups. Both mean body weight gain in entire period and daily body weight gain did not differ significantly between T1 and T2, but T3 differed significantly from both T1 and T2 groups. The mean body weight gain was apparently higher in male than the female piglets. The daily body weight gain observed in the present experiment was comparable with the report of the researchers[7&9] in various breeds of pigs. However, higher mean daily body weight gain were reported by different workers[8&14] in Large White Yorkshire pigs. Again, the previous author[6] reported higher average daily gain in intermittent suckling (190 g per day) group than conventionally suckling (150 g per day) group of Iberian piglets during the pre-weaning period. The difference in body weight gain might be due to differences in methods of weaning, days of weaning, composition of diet, breeds and the agro-climatic conditions under which the piglets were raised in different investigations.

Body measurements of piglets

The mean body measurements have been mentioned in Table 2. There was highly significant difference (P<0.01) of body length among the suckling groups at different weeks of age. The body lengths of piglets observed in the present study were similar to the observations reported by several workers[5&19] at 8th week of age in Landrace breed of piglets. The author[17] reported higher mean body length in male than in the female crossbred piglets at 8th week of age.

There was highly significant difference (P<0.01) in heart girth among the suckling groups at 5th, 6th, 7th and 8th week of age. The heart girth in the present study was comparable with the report of [5&19] at 8th week of age in Landrace breed of piglets. But, the scientist[11] found very less mean chest girth (18.12 cm) at 8th week of age in Hampshire piglets.

Table 2. Average body measurements (cm) in different treatment groups

Age (Weeks)	Body length			Heart girth			Height at withers		
	T1	T2	T3	T1	T2	T3	T1	T2	T3
4th	36.83 ±0.58	37.93 ±0.29	37.85 ±0.32	36.49 ±0.53	36.46 ±0.21	36.60 ±0.20	26.25 ±0.20	26.11 ±0.14	26.72 ±0.23
5th	37.7 ±0.38[a]	40.76 ±0.38[b]	43.46 ±0.36[c]	37.16 ±0.70[a]	40.74 ±0.42[b]	42.62 ±0.35[c]	26.73 ±0.30[a]	27.89 ±0.25[b]	29.79 ±0.29[c]
6th	41.10 ±0.72[a]	44.24 ±0.40[b]	46.94 ±0.34[c]	41.55 ±0.96[a]	44.45 ±0.40[b]	45.57 ±0.35[b]	28.58 ±0.31[a]	29.32 ±0.32[a]	30.68 ±0.17[b]

7th	43.64 ±0.71[a]	47.61 ±0.45[b]	50.46 ±0.37[c]	44.27 ±0.85[a]	48.05 ±0.43[b]	48.40 ±0.39[b]	30.49 ±0.33[a]	32.23 ±0.33[b]	32.23 ±0.22[b]
8th	46.16 ±0.75[a]	51.37 ±0.41[b]	53.84 ±0.52[c]	46.96 ±0.82[a]	51.28 ±0.42[b]	50.74 ±0.40[b]	31.82 ±0.30[a]	33.93 ±0.28[a]	38.20 ±1.29[b]

Means with different superscripts within a row differ significantly.

There was highly significant difference (P<0.01) of mean height at withers among the suckling groups at 5th, 6th, 7th and 8th week of age. The mean height at withers of piglets in the present study was similar to the findings by [5&19] in Landrace piglets at 8th week of age. Some reported[11] less mean height at withers at 8th week of age in Hampshire piglets than the present investigation. The mean height at withers of male piglets was found to be significantly more at 7th and 8th week of age in the present investigation. However, [17] reported maximum height at withers in crossbred female than male piglets.

Correlation and regression coefficient

The overall correlation coefficient of body weight with body length, heart girth and height at withers was 0.87, 0.88 and 0.67, respectively. The correlation between body weight and body measurements was highly significant for length, heart girth and height at withers. The overall correlation coefficients of the present study were lower than those observed by few other authors[2,12&21] in various breeds of pigs. Whereas, the correlation coefficient at 8th week was higher than the report[16] in Nigerian indigenous pigs. The regression coefficients of body length, heart girth and height on body weight were 0.15±0.02, 0.18±0.02 and 0.02±0.01 respectively. The analysis revealed highly significant (P<0.01) regression coefficient of body length and heart girth and non-significant regression coefficient of height at withers on body weight of the piglets. Previous workers[18]reported the linear regression of body weight and linear body measurements like body length, heart girth and height in pre-weaned Nigerian Indigenous crossbred pigs as 0.01, 0.113 and 0.20 respectively. The difference in correlation and regression coefficient might be due to differences in breed, nutrition and agro-climatic conditions.

Feed consumption and cost of feeding:

The average daily feed consumption (except dam's milk) per piglet was 0.139 ± 0.01, 0.162 ± 0.01 and 0.176 ± 0.01 kg in T1, T2 and T3 groups, respectively. The average cost of feeding per kg body weight gain in piglets was worked out to be ₹ 25.12±3.46, 24.48±2.71 and 20.23±2.04for T1, T2 and T3 groups, respectively. There was highly significant (P<0.01) difference for cost of feeding per litter among the groups. But, there was non-significant difference for cost of feeding per kg body weight gain among the suckling groups. Similar findings were found in early weaning of piglets by two studies[10&20]. Both of them reported that the cost of feed per kg weight gain were lowest in early weaned piglets than normal weaning piglets.

CONCLUSION

The body weight and body weight gain were better in restricted suckling group. Body measurements were also found to be improved in restricted suckling group than the normal suckling. There was significant correlation between the body weight and body measurements. It can be concluded from the present study that the growth performance of Hampshire piglets may be enhanced through restricted suckling form 4th week onward for maximizing the farmers' income.

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