



Growth Performances of Fattening Pigs on Three Different Flooring Systems

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ABSTRACT

The influence of the flooring pattern on the growth performance of Large White Yorkshire weaned pigs was investigated in three different flooring systems. Three different flooring systems in conventional pig farming viz., solid concrete floor (T_1), raised slatted concrete floor (T_2) and raised slatted polypropylene floor (T_3) formed the experimental housing design and three equal size stys measuring 3.50 m x 2.90 m were taken. Pigs in the different housing systems were maintained on standard floor space of 0.8-1.0 m² with similar feeding practices and management conditions. Under each treatment, 10 numbers (5 males and 5 females in each treatment) of weaned Large White Yorkshire pigs were allotted with average body weight of 16.50±0.50 kg. Growth parameters like body weight, body weight gain, and average daily feed intake were recorded fortnightly and statistically there was no significant ($P<0.01$) difference observed between the treatment groups except eighth fortnight interval with highly significant difference ($P<0.01$) was observed. Pigs reared in (T_2) raised slatted concrete floor had higher body weight gain (7.50±0.85 kg) followed by solid concrete floor T_1 (7.20±0.60kg) and raised slatted polypropylene floor T_3 (6.90±0.31 kg).

Key Words: Body weight, Feed intake, Flooring pattern, Growth, Large White Yorkshire, Performance.

INTRODUCTION

Pig farming provides the livelihood of rural poor belonging to the lowest socio-economic status, and they have no access to undertake scientific pigs farming with improved foundation stock, proper housing, feeding and management. Pig production has enormous potential to ensure the nutritional and economic security for the weaker sections of the society. In 20th livestock census of India, Pig population is about 9.06 million which is lesser than the 19th livestock census (10.29M) of the total pig population. The population had decreased about 12.06 per cent of total pig population, it may be of diseases outbreak or unawareness of profitable pig farming among the people (Anonumous, 2012 & 2020).

Raising pigs is an important operation which requires great deal of management, skill, application of scientific management practices and constant care and attention, as it lacks in some livestock farms

(Saikia *et al*, 2019). In any livestock production system, the floor is in constant contact with animals throughout their life. Yasotha and Sivakumar (2013) conducted a study on effects of different flooring patterns on the growth performance of Madras Red lambs. Therefore, a study on growth performance of pigs under different flooring systems was chosen to evolve a suitable flooring system for intensively reared pigs in tropical climate and to augment the production in pigs during their lifetime.

MATERIALS AND METHODS

Experimental housing designs

Thirty numbers of homogenous stocks of weaned Large White Yorkshire piglets of both sexes were taken for the study. The piglets were weaned at the age of 30 d with the average body weight around 7.5 kg. Three different flooring systems of pig rearing viz., Solid concrete floor (T_1), Raised slatted concrete floor (T_2) and Slatted raised

Table 1. Mean ($\pm$ SE) of body weight (kg) of Large White Yorkshire grower pigs maintained in three different flooring systems and its analysis of variance

Fortnight	Age (days)	Solid Concrete Floor (T_1)	Raised Slatted Concrete Floor (T_2)	Raised Slatted Polypropylene Floor (T_3)	'F' value
At weaning	42	6.34 $\pm$ 0.13	6.53 $\pm$ 0.14	6.33 $\pm$ 0.18	0.551 ^{NS}
1	90	16.71 $\pm$ 1.80	17.26 $\pm$ 1.78	16.20 $\pm$ 1.85	0.085 ^{NS}
2	105	19.91 $\pm$ 2.25	21.70 $\pm$ 1.71	21.85 $\pm$ 2.18	0.274 ^{NS}
3	120	23.75 $\pm$ 2.89	25.25 $\pm$ 2.37	25.82 $\pm$ 2.51	0.169 ^{NS}
4	135	30.20 $\pm$ 3.63	31.00 $\pm$ 2.82	31.30 $\pm$ 3.38	0.030 ^{NS}
5	150	34.60 $\pm$ 3.83	34.35 $\pm$ 3.21	35.05 $\pm$ 3.40	0.010 ^{NS}
6	165	39.10 $\pm$ 4.15	38.50 $\pm$ 3.78	40.70 $\pm$ 4.31	0.077 ^{NS}
7	180	43.95 $\pm$ 4.24	43.00 $\pm$ 4.36	44.30 $\pm$ 4.57	0.023 ^{NS}
8	195	48.30 $\pm$ 4.48	50.80 $\pm$ 5.16	47.10 $\pm$ 4.98	0.149 ^{NS}
9	210	54.40 $\pm$ 4.41	57.30 $\pm$ 4.86	53.10 $\pm$ 4.91	0.206 ^{NS}
10	225	61.40 $\pm$ 4.79	64.60 $\pm$ 14.42	60.0 $\pm$ 5.09	0.239 ^{NS}

NS – Not significant ($P > 0.05$)

polypropylene floor (T_3) were constructed as an experimental housing designs and 10 animals were allotted in each flooring system. Pigs were provided with a floor space of 1 sq.m per animal. Three pens of equal sizes measuring 3.50 m x 2.90 m were taken for the treatment T_1 , T_2 and T_3 respectively within roofed area. Each pen had feeding trough and nipple drinker.

Growth performance of pigs in different flooring pattern

Growth performances of Large White Yorkshire weaned pigs were recorded at fortnightly interval. Growth parameters include body weight, daily feed intake and body weight gain were recorded at fortnight interval in all three treatment groups. The collected data were statistically analysed by One Way ANOVA by using IBM SPSS® Version 20.0 for Windows®. The significance was tested using Duncan's multiple range test and Post Hoc technique to compare the experimental groups.

RESULTS AND DISCUSSION

Body weight

The fortnightly body weight of Large White Yorkshire grower pigs maintained in three different flooring systems (Table 1) revealed that there is no significant difference between the treatment groups during all the fortnightly measured body weights and the body weight had increased gradually from day 90 to 225 days of age which was in accordance with Agostini *et al* (2014), statistically the floor type had no significant effect on the growth performance of growing finishing pigs. However, the pigs reared in raised slatted concrete floor (T_2) gained numerically higher final body weight of 64.60 $\pm$ 14.42 kg than solid concrete floor (T_1) of 61.40 $\pm$ 4.79 kg and raised slatted polypropylene floor (T_3) 60.00 $\pm$ 5.09 kg.

The higher body weight recorded in T_2 group of pigs reflects the beneficial effect of raised slatted concrete floor system throughout the age of fattening pigs in all the seasons. This was in accordance with

Table 2. Mean ($\pm$ SE) of body weight gain (kg) of Large White Yorkshire grower pigs maintained in three different flooring systems and its analysis of variance.

Fortnight	Age in days	Solid Concrete Floor (T_1)	Raised Slatted Concrete Floor (T_2)	Raised Slatted Polypropylene Floor (T_3)	'F' value
1	90	10.37 $\pm$ 1.84	10.73 $\pm$ 1.75	9.87 $\pm$ 1.79	0.570 ^{NS}
2	105	3.20 $\pm$ 0.83	4.44 $\pm$ 0.64	5.64 $\pm$ 0.84	2.472 ^{NS}
3	120	3.84 $\pm$ 0.73	3.65 $\pm$ 0.88	4.97 $\pm$ 0.83	0.766 ^{NS}
4	135	6.75 $\pm$ 0.83	5.75 $\pm$ 0.60	5.48 $\pm$ 1.31	0.483 ^{NS}
5	150	4.90 $\pm$ 0.93	3.35 $\pm$ 0.48	3.65 $\pm$ 0.43	1.581 ^{NS}
6	165	4.60 $\pm$ 0.54	4.35 $\pm$ 0.70	5.65 $\pm$ 1.07	0.685 ^{NS}
7	180	4.85 $\pm$ 0.74	4.60 $\pm$ 0.70	3.50 $\pm$ 0.59	1.124 ^{NS}
8	195	4.95 $\pm$ 1.03	6.80 $\pm$ 0.90	2.80 $\pm$ 0.77	4.832 ^{**}
9	210	6.30 $\pm$ 0.31	6.50 $\pm$ 0.54	6.90 $\pm$ 0.25	0.471 ^{NS}
10	225	7.20 $\pm$ 0.60	7.50 $\pm$ 0.85	6.90 $\pm$ 0.31	0.231 ^{NS}
Overall body weight gain (kg)		5.726 $\pm$ 0.863	5.737 $\pm$ 0.78	5.536 $\pm$ 0.82	0.692 ^{NS}

NS – Not significant ($P > 0.05$)^{**} Significant at one percent level ($P < 0.01$)**Table 3. Fortnight daily feed intake (kg) of Large White Yorkshire grower pigs maintained in three different flooring systems**

Fortnight	Age in Days	Solid Concrete Floor (T_1)	Raised Slatted Concrete Floor (T_2)	Raised Slatted Polypropylene Floor (T_3)
1	90-104	0.428	0.45	0.44
2	105-119	0.651	0.67	0.664
3	120-134	0.91	0.933	0.924
4	135-148	1.13	1.15	1.14
5	149-163	1.38	1.4	1.39
6	164-178	1.63	1.66	1.64
7	179-193	1.76	1.78	1.775
8	194-208	1.94	1.97	1.963
9	209-224	2.158	2.185	2.169
Average feed intake (kg)		1.334	1.352	1.343
Total feed intake (kg)		1683.36	1703.52	1692.18

the observation of Caldara *et al* (2014), Devillers *et al* (2019) and Lebert *et al* (2011) who recorded improved productivity due to effect of slatted and concrete flooring pattern. However, they recorded higher growth performance of growing-finishing pigs in slatted floor and concrete floor pattern as well. In this present study, numerically higher body weight of grower pigs observed in raised slatted concrete floor. Correa *et al* (2009) and Zhou *et al* (2015) reported that the flooring systems did not have effect on the body weight in grower pigs. This was in contrary with Caldara *et al* (2014) who observed the influence of floor type and floor space available to pigs on the growth performance in heavy pigs. Similarly, Yasotha *et al* (2013) also observed the influence of floor type on the growth performance of Madras Red lambs and found higher body weight in slatted floor than mud floor. However, Sundaram *et al* (2012) and Sivakumar *et al* (2017) noticed that housing system did not have effect on the body weight in Madras red lambs and dairy cows under intensive system.

Body weight gain

In the present study, the overall body weight gain of Large White Yorkshire grower pigs in three different flooring system showed that there was no significant difference in body weight gain of pigs between the treatment groups. The statistical analysis revealed significant difference ($P < 0.01$) in body weight gain between the treatment groups only during the eighth fortnight (Table 2). However, the pigs reared in raised slatted concrete floor T_2 of 57.37 ± 7.09 kg gained numerically higher body weight gain followed by solid concrete floor (T_1) of 56.70 ± 8.63 kg and raised slatted polypropylene floor (T_3) 55.36 ± 8.19 kg. The results were in agreement with the observation made by Caldara *et al* (2014), Colson *et al* (2012), Kumar *et al* (2014), Paiano *et al* (2017) who had found statistically the floor type had no significant difference on the body weight gain of pigs. Agostini *et al* (2014) observed that body weight gain was significantly affected by the flooring pattern. The similar trend

of higher body weight gain was observed on slatted flooring pattern in Madras Red lambs by Yasotha *et al* (2013) and found the variation in growth rate between the floor types. However, the total average body weight gain obtained in the treatment group (T_2) was numerically higher which indicates the animal comfort zone to improve their productivity. This was in agreement with Kumaravel *et al* (2017) Rossi *et al* (2008), who observed that pigs on all the floor types tended to gain more weight with standard space allowance for pigs.

Feed intake

The fortnightly average feed intake of Large White Yorkshire grower pigs in raised slatted concrete floor (T_2) was higher (1703.52 kg) than raised slatted polypropylene floor (T_3) (1692.18 kg) and solid concrete floor (T_1) (1683.36kg) and it was mentioned in Table 2. However, Devillers *et al* (2019), Lebert *et al* (2011) and Rossi *et al* (2008), observed similar trends of higher feed intake of pigs either on slatted floor or on concrete flooring pattern but in the present study a higher feed intake was observed in combined form of raised slatted flooring pattern (T_2).

CONCLUSION

The findings of this study pointed out the suitable flooring pattern to growing pigs to improve the pig production and maintain the welfare of animals in the sty. At the end of the trial, higher body weight gain (7.50 ± 0.85 kg) was observed in pigs reared in (T_2) raised slatted concrete floor followed by grower pigs maintained in solid concrete floor T_1 (7.20 ± 0.60 kg) and raised slatted polypropylene floor T_3 (6.90 ± 0.31 kg). However, there was highly significant difference ($P < 0.01$) in eighth fortnight body weight gain were observed between the treatment groups. It was concluded from the study that floor type did not influence the growth performance of intensively reared pig however, combination of slatted with concrete flooring pattern was found to suitable considering the comfort of the intensively reared pigs.

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