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Research paper

Effect of different housing systems on physiological, ethological and growth performances of crossbred (Hampshire X Tenyi Vo) pigs in Nagaland

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ABSTRACT

Experimental study on the effect of different housing system on the physiology, ethology and growth performance of Hampshire X Tenyi Vo cross bred pigs in Nagaland using twenty one weaned pigs of forty two days old irrespective of sex were undertaken. The animals were divided into three groups and reared under three housing systems viz. Standard housing with wooden floor (T_1), concrete floor (T_2) and indigenous housing with concrete floor (T_3). The piglets' behavioural activities were recorded and the data showed that animals in T_1 spent more time in feeding and drinking while T_2 spent more time in resting. The animals reared in standard housing with wooden floor recorded the highest rectal temperature of 38.73^0 C as compared to the animals reared in standard housing with concrete floor. The respiratory rate of the Upgraded Tenyi Vo under treatment did no differ significantly and is within the normal range. The average body weight of the animals at the end of the study were recorded as 8.79, 10.50 & 9.84 Kg. for T_1, T_2 and T_3 respectively, with no significant difference in the average daily gain of the animals under treatment. Hampshire X Tenyi Vo cross bred pigs reared in standard housing with concrete floor showed improvement in the overall body weight gain.

Keywords: Hampshire X Tenyi Vo cross bred piglets, housing system, physiology, ethology, growth performance.

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INTRODUCTION

Tenyi Vo an indigenous pig breed of Nagaland are small to medium in size, with small erect ears, alert eyes, exhibit early sexual maturity and thrive well in the local climatic condition. In recent years there has been major improvement in the quality of pigs through cross breeding of indigenous with exotic pigs. Crossing of Indigenous Tenyi Vo pig with exotic Hampshire boar has been introduced by Indian Council of Agricultural Research-All India Coordinated Research Project on pig (ICAR-AICRP on pig), Nagaland Centre, Department of Livestock Production and Management (LPM), Nagaland University, School of Agricultural Sciences and Rural Development (NU-SASRD), Medziphema Campus. Hampshire X Tenyi Vo cross bred pig is becoming popular among the local farmers where the housing system is temporarily constructed using locally available materials. Flooring is one of the major aspects in pig housing where the local farmers prefer using wood as a platform which is easily affordable. The use of concrete floor have gain importance in recent years that provides better health and sanitation for the animals as well and as long lasting and economical to the farmer. Animal behaviour expressed individually or collectively is an overt and composite functioning of animals. Learning and knowing the animal behaviour enables farmers and experts to develop better production system and obtain faster growth rate utilizing the feeds and ration efficiently. Therefore, a systematic study to record and evaluate the behavioural activities of Hampshire X Tenyi Vo cross bred pigs reared under different housing system was carried out at ICAR-AICRP on pig, Nagaland Centre, LPM, NU-SASRD, Medziphema Campus.

MATERIALS AND METHODS

The experimental research work had been carried out at the research farm of ICAR- AICRP on pig, Nagaland Centre, Nagaland University, School of Agricultural Sciences and Rural Development, Medziphema Campus from 1st October to 1st December 2016. Twenty one weaned Hampshire X Tenyi Vo cross bred (75% Hampshire and 25% Tenyivo) piglets of forty two days of age were randomly selected irrespective of sex and divided into three groups of seven animals under different housing system viz. standard housing with wooden floor (T_1), Standard housing with concrete floor (T_2) and indigenous housing with concrete floor (T_3). Standard feed ration containing 18% crude protein was prepared as per Bhat *et al*. (2010). The piglets were fed twice daily and the quantity of concentrate ration increased each week at the rate of 50g per each animal.

Respiration rate was recorded by counting the rise and fall of the ribs and abdominal wall for a minute. Rectal body temperature was collected once a week at morning hour prior to feeding using clinical thermometer. Behavioural

activities of the animals were recorded by direct observation of the animals as per the methodology described by Martin and Bateson (1986) that includes feeding, drinking and resting. Observation for all the parameters was split into three days where each pen was routinely observed on Friday, Saturday and Sunday for T_1, T_2 and T_3 respectively for a period of eight hours divided into two intervals, morning period from 07:00 to 11:00 hours and evening period from 13:00 to 17:00 hours. The feeding parameters: frequency of eating and time taken to consume supplied feed; drinking behaviour and number of drinks and time spent in lying down and frequency of lying down during the eight hours of observations were recorded. The experimental data was statistically analysed by following Repeated Measures Design (RMD).

RESULT AND DISCUSSION

The rectal temperature of Hampshire X Tenyi Vo cross bred was recorded at 38.73^{0}C, 38.55^0 C and 38.71^{0}C for T_1, T_2 and T_3 respectively, which was within the normal range of 38.5^0 C to 39.5^0 C as was also reported by Øystein *et al.* (2003). A significant difference was observed among the treatments where the animals reared in standard housing with wooden floor recorded the highest rectal temperature as compared to the animals reared in standard housing with concrete floor which recorded the least rectal temperature and this was in agreement with Caldara *et al.* (2012) who also reported the rectal temperature as 39.3^0 C and 39.0^0 C for both wooden shaving and concrete floor housing system respectively. The average respiratory rate recorded was 19.01, 18.23 and 18.63 beats per minute for T_1, T_2 and T_3 respectively, with no significant variation among the treatments and these were in agreement with the findings of Jackson and Cockcroft (2007) who reported that the normal resting respiratory rate for the grower and finisher pigs ranges from 10-20 beats per minutes.

The average feeding time of the experimental animals was recorded as 53.94, 47.49 and 42.77 minutes for T_1, T_2 and T_3 housing system and the corresponding number of times the animal indulged in feeding were 7.94, 6.26 and 6.97 for T_1, T_2 and T_3 respectively. A significant difference in the feeding time among the three treatments was observed with no significant difference in the number of time the animals indulged in feeding. Housing system significantly influenced the feeding behaviour of the pigs kept in wooden floor that spent more time in feeding compared to those pigs kept in concrete flooring system. Similar findings by Pazzini *et al*. (2014) who reported that pigs in deep litter system spent more time in eating than those pigs kept in concrete flooring and the difference may be due to the variation in the materials of the housing system and climatic conditions. The observation period significantly influenced time spent in feeding and the number of times the animal indulged in feeding, during the first week animals spent most time in feeding activities. This finding was in agreement to the report made by Hötzel *et al.* (2009) who also recorded higher feeding activities during the initial period of observation.

The average drinking time of the animals under the three housing system T_1, T_2 and T_3 was 126.71, 70.17 and 75.80 seconds respectively, showing significant difference among the treatments and over time period. The number of drinks the animals indulged during the observation was recorded as 25.91, 13.97 and 18.54 for T_1, T_2 and T_3 times respectively, with no significant difference among the treatments. The drinking behaviour was higher during the fourth week of observation. The variations in drinking behaviours were also reported in other housing system by Haskell *et al.* (1996) and that drinking behaviour increases with time. The difference in drinking behaviour was associated with numerous factors like increase in body weight, climate, feeds, housing pattern and management system. The number of pigs reared per pen also influenced the drinking behaviour of the experimental animal as reported by Andersen *et al*. (2014).

The average value of the time spent in resting was recorded as 162.74, 174.37 and 171.60 minutes for T_1, T_2 and T_3 and the corresponding value for the number of times indulged in resting for the three groups were 18.71, 13.69 and 15.29 respectively, showing no significant differences among treatment. Hötzel *et al.* (2009) reported similar findings in the time spent by the animals in lying down in deep bedding with wood shavings, deep bedding with paddy husk and concrete flooring which was in support to the findings indicating that the various housing system used for the experimental research did not influence the resting behaviour of the animals. During the initial period of observation period the time spent in resting and the number of times the animals indulged in resting was less which was in line with the findings of Presto *et al.* (2008) who reported that the resting for indoor pigs was lesser during the initial stage. This may be due to the explanatory behaviour of the weaned pigs when introduced into a new environment where the piglets spent more time in exploring and less time in resting.

The average body weight of Hampshire X Tenyi Vo cross bred of all the three group of the pigs at the end period of the study was 8.79, 10.50, 9.84 Kg for T_1, T_2 and T_3 respectively. The Average Daily Gain (ADG) was 0.065, 0.076 and 0.070 Kg for T_1, T_2 and T_3 respectively and there was no significant variation among the treatments, which was in agreement with Gentry *et al.* (2012), who also reported that there was no significant difference in ADG of

Table 1: Effect of different treatment on physiological, ethological and growth performance of Hampshire X Tenyi Vo crossbred

Parameters	Treatment mean		
	T_1	T_2	T_3
Initial Body weight (Kg)	4.68	5.71	5.41
Final body weight (Kg)	8.79	10.5	9.84
Average daily gain (Kg)	0.065	0.076	0.070
Body temperature (^{0}C)	38.73	38.55	38.71
Respiratory rate (mov/min)	19.01	18.23	18.63
Time spent in feeding (minutes)	53.94	47.49	42.77
Number of time indulged in feeding	7.94	6.26	6.97
Time spent in drinking (seconds)	126.71	70.17	75.80
Number of drinks	25.91	13.97	18.54
Time of resting (minutes)	162.74	174.37	171.60
Number of times animals lie down	18.71	13.69	15.29

T_1- Group one (Control), T_2- Group two, T_3- Group three

the animals reared during the winter seasons. This research finding was also in line with Morrison *et al.* (2007) who reported that the growth rate of the animals was not influenced by the housing system. There was significant variation in ADG for time period of observation where it was highest during the final week of the study which was similar to the findings of Kaswan *et al.* (2015) who reported that ADG of the animals increases with increasing week of observation and was higher during the final week.

CONCLUSION

Hampshire X Tenyi Vo cross bred piglets reared in standard housing with concrete flooring was recorded with better growth, normal physiological and ethological behaviour over the other housing system. Therefore, the standard housing with concrete flooring system can be recommended for Hampshire X Tenyi Vo cross bred pig in Nagaland to get desirable performance.

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