GROWTH PERFORMANCE AND SKIN LESION SCORE OF WEANED PIGS REARED ON GUINEA GRASS BEDDED PIGSTIES

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ABSTRACT

In order to ensure sustainable pig production in most tropical countries, alternative flooring systems need to be investigated and adopted. A five-week experiment was carried out to investigate the growth performance and skin lesion score of 36 weaned pigs, separated into four treatments with three replicates each, in a completely randomized design. The treatments include three different heights of Guinea Grass Straw (GGS): T1 (without GGS): concrete floor, T2: 0.1m high GGS, T3: 0.2m high GGS and T4:0.3m high GGS. Data were collected on growth performance: final weight, weight gain, feed intake and feed conversion ratio (FCR) and skin lesion (front, middle and rear). All data obtained were subjected to analysis of variance (ANOVA). Weight gain 4.75kg (T3) was higher ($P<0.05$) when compared with 4.28kg (T2), 3.94kg (T4) and 3.34kg (T1). Final weight followed similar trend with pigs in T3 (9.94kg) having the highest weight compared with T2 (9.40kg), T4 (9.22kg) and T1 (8.55kg). Higher ($P<0.05$) FCR was recorded for T1 (4.72) while the least was in T3 (3.39). The result for skin lesion for the different parts observed, revealed the least lesion in pigs on T3 and higher occurrence in pigs on T1 (without beddings). Generally, skin lesions occur most at the front legs and heads. It can be concluded that the use of guinea grass straw at the depth of 0.1m and 0.2m can improve the performance of weaned piglets, while guinea grass straw of 0.3m high reduced skin lesions score.

Keywords: Beddings, depths, environmental enrichment, guinea grass, weaned pigs

INTRODUCTION

The value of enrichment materials for pigs could be higher if the materials are complex and compound (Jensen and Pedersen, 2007) and include one or more attractive food components (Olsen *et al.,* 2000). Studnitz *et al*. (2007) concluded that exploratory behaviour of pigs is best stimulated by materials that are complex, changeable, destructible, manipulable and contain sparsely distributed edible parts. Experts on pig welfare assign considerable importance to the availability of a substrate such as straw in their welfare assessments of housing systems (Spoolder *et al*., 2003). Enrichment and flooring are important factors affecting the incidence of injuries and stomach ulcers in pigs. Ariane *et al.* (2005) evaluated the impact of housing systems on the health and welfare of grower and finisher pigs. Evaluation of pig behaviours associated with health and welfare were assessed through indicators including presence of lesions on the snout, ears, shoulders, legs and tail. Ramis *et al.* (2005) found that the prevalence of limb lesions was much greater in barren-housed pigs (24% of observations) compared to pigs housed in sawdust-bedded barns (1% of observations). Guinea Grass (*Panicum maximum*) which is indigenous to Africa and widely distributed in West Africa, grows naturally in many parts of Nigeria, this could therefore help in boosting welfare-friendly pig production systems in Nigeria. Hence, this study was conducted to investigate the growth performance and skin lesion score of weaned pigs reared on guinea grass bedded pigsties.

MATERIALS AND METHOD

The experiment was carried out at the Piggery Unit of the Teaching and Research Farm, University of Ibadan, Ibadan, Oyo State.Thirty-Six (36) (Land race X Large white) weanling pigs were used for the study. The animals were kept and monitored for one week for acclimatization and proper adaptability before the commencement of the experiment. Animals were fed with commercial feed and water was provided *ad libitum*. The treatments were the control (without straw) and three different heights of Guinea Grass Straw (GGS): T1: concrete floor (without GGS), T2: Guinea Grass Straw (0.1m high), T3: Guinea Grass Straw (0.2m high), T4: Guinea Grass Straw (0.3m high). Growth performance data were collected on initial weight, feed intake, weight gain, final weight and feed conversion ratio (FCR).For the purpose of skin lesion assessment, the body of the pigs was divided into three parts. Each part received a score based on the number of lesions on it. The parts of the body assessed were: (1) front (head, neck, shoulders and front legs), (2) middle (flanks and back) and (3) rear (rump, hind legs and tail). To keep the scores consistent throughout the experiment, direct observation of the skin

following the checklist of Björklund (2005) was used. All data obtained were subjected to analysis of variance (ANOVA) using SAS 9.2 (2012) Software. Means were separated using Duncan's Multiple Range Test (DMRT) of the same statistical software.

RESULTS

PERFORMANCE CHARACTERISTICS

The effect of different height of guinea grass straw beddings on performance characteristics of weaned pigs was as shown in Table 1. The average initial weights ranged from 5.12kg to 5.28kg. There was no significant effect (P>0.05) of the different straw height on the feed intake, however, pigs in T1 consumed the highest feed (15.73kg) while the least was 15.56 in pigs on T3 and T4. There was significant (P<0.05) difference in weight gain, final weight and FCR. Weight gain in T3 (4.75kg) was higher compared to 4.28kg (T2), 3.94kg (T4) and 3.34kg (T1). Final weight followed the same trend with pigs in T3 (9.94kg) having the highest weight compared to T2 (9.40kg), T4 (9.22kg) and T1 (8.55kg). Highest FCR was recorded in T1 (4.72) while the least was in T3 (3.39).

Table 1: Effect of different height of guinea grass straw beddings on performance characteristics of weaned pigs

Depth(m)	Initial weight(kg)	Feed intake(kg)	Weight gain(kg)	Final weight(kg)	FCR
T1	5.21	15.73	3.34^{b}	8.55^{c}	4.72^{a}
T2	5.12	15.60	4.28^{ab}	9.40^{ab}	3.68^{b}
T3	5.19	15.56	4.75^{a}	9.94^{a}	3.39^{b}
T4	5.28	15.56	3.94^{ab}	9.22^{bc}	3.98^{ab}
SEM	0.22	0.05	0.17	0.11	0.13

^{a,b,c} means on the same column with different superscripts are statistically significant (P<0.05)

SEM: Standard error of means; T1: Concrete, T2: Guinea grass staw at 0.1m high, T3: Guinea grass straw at 0.2m high, T4: Guinea grass straw at 0.3m high, FCR: Feed conversion ratio

SKIN LESION OBSERVATIONS

The mean skin lesion score on the front body part among the treatments is reported in Figure 1. It was observed that the control treatment (T1) had lesions at the various parts (front legs (1), shoulder (1), neck (1)) and recorded the highest score (2) for head among the treatments. The least lesion was recorded in GG 0.3 where lesion was observed only in the front leg (1). Figure 2 illustrates the mean skin lesion score on the middle body part of the pigs among the treatments. T2 and T4 had no record of lesions. However, the control (T1) and T3 recorded a lesion score of 1 each on the flank. Figure 3 shows the mean skin lesion score on the rear body part of the pigs among the treatments. There was no record of lesion on pigs in T3 and T4. However, the control (T1) had lesion records for hind leg (1) and tail (1) while T2 had a lesion record for hind leg (1).

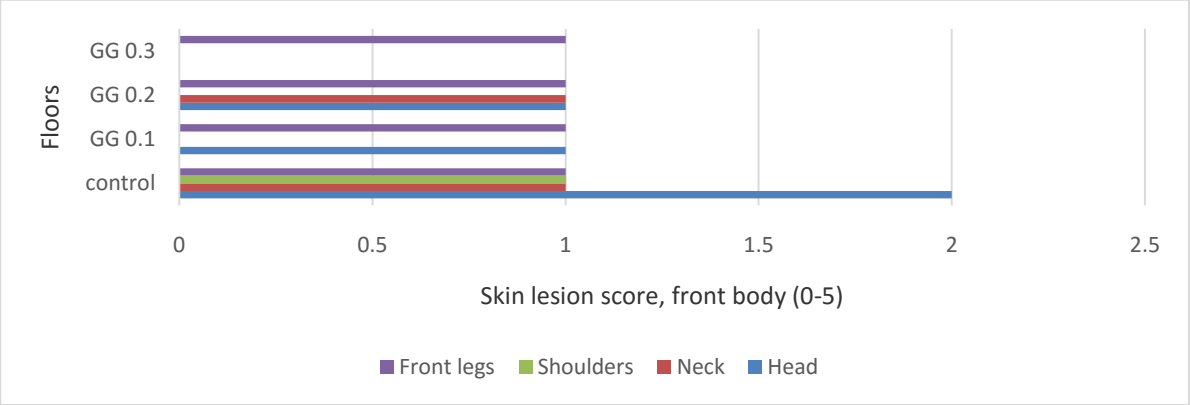


Figure 1: Mean skin lesion score on the front body part of the pigs among the treatments
Control: Concrete at 0metres high; GG 0.1: Guinea grass bedding at 0.1metres high; GG 0.2: Guinea grass bedding at 0.2metres high; GG 0.3: Guinea grass bedding at 0.3metres high.

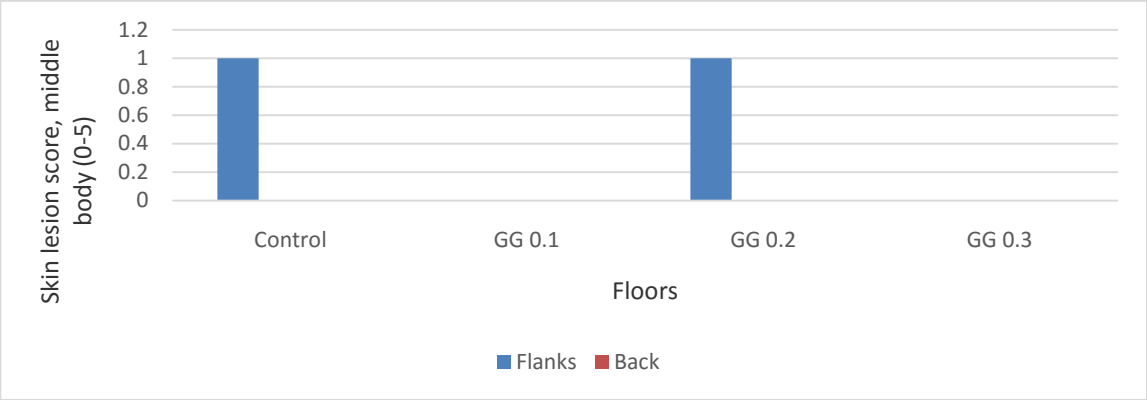


Figure 2: Mean skin lesion score on the middle body part of the pigs among the treatments
Control: Concrete at 0metres high; GG 0.1: Guinea grass bedding at 0.1metres high; GG 0.2: Guinea grass bedding at 0.2metres high; GG 0.3: Guinea grass bedding at 0.3metres high

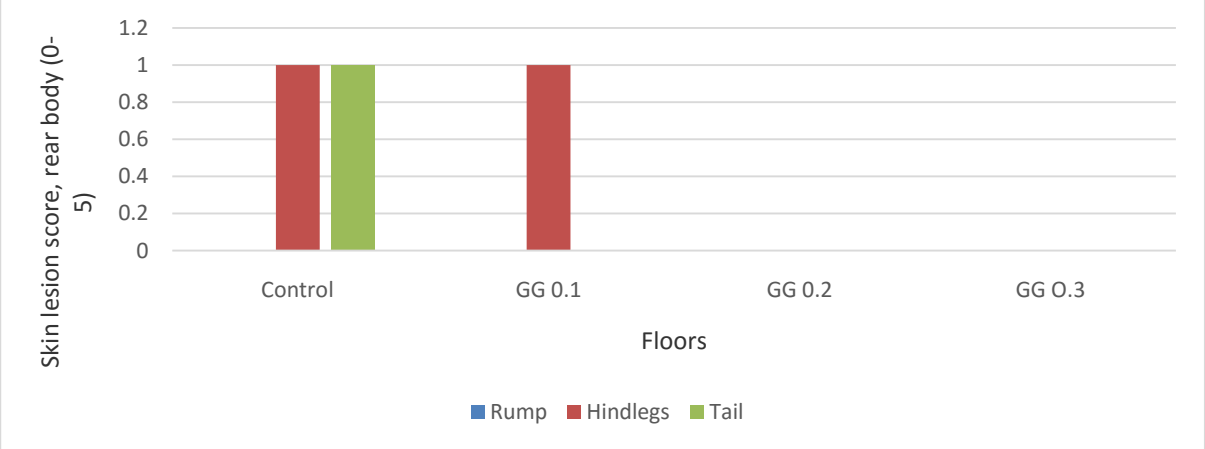


Figure 3: Mean skin lesion score on the rear body part of the pigs among the treatments
Control: Concrete at 0metres high; GG 0.1: Guinea grass bedding at 0.1metres high; GG 0.2: Guinea grass bedding at 0.2metres high; GG 0.3: Guinea grass bedding at 0.3metres high.

DISCUSSION

Environmental enrichment is crucial for pig production as it reflects in their performance and welfare. In this study it was observed that treatments with beddings had higher values for final weight and weight gain. This corroborate the findings of Vanheukelom *et al*. (2011) that reported an increase in post weaning weight gain for pigs housed in an enriched environment. In the study of Van de Weerd *et al.*, (2006) using different enrichment substrates, it was reported that pigs housed in straw-bedded pens had higher daily weight gain than their counterparts. Conversely, Jordan (2013) reported that straw and hay did not influence growth rates of pigs. It was also observed in this study that the FCR across the treatments were lower in treatments with beddings when compared to the concrete floor. This was in agreement with the report of Beattie *et al.* (2000) that observed a similar trend in pigs reared on wood shavings as against concrete floor.

The provision of guinea grass bedding in this study was beneficial to the pigs as most of the lesions recorded were from pigs housed in concrete floor. This agreed with the findings of Ramis *et al*. (2005) on prevalence of limb lesions in barren-housed pigs (24% of observation) compared with pigs housed in sawdust-bedded barns (1% of observations).Specifically, Peterson *et al*. (1995) reported that pigs housed in pens enriched with straw, logs, and branches spent more time rooting, biting, and chewing the provided materials, whereas pigs housed in barren environments spent more time rooting, biting, and chewing the floors and walls of their pen. These findings suggest that any environmental enrichment that promotes exploration and is an outlet for oral activities may be the most effective means of redirecting oral vices away from pen fittings and penmates in order to improve animal well-being. This might explain the reason why in this study, tail lesion was only recorded in the control (without guinea grass straw) since there was absence of explorative materials that could help divert the attention of the weaner pigs. On the contrary, Scott *et al.* (2006) reported that adding enrichment objects to straw-bedded pens had no influence on skin injuries.

CONCLUSION

It is therefore, concluded that guinea grass height of 0.1m and 0.2m are preferred for the enhancement of the conventional concrete floor in consideration for growth performance, while height of0.3m is excellent enhancement of concrete floor in terms of skin lesion occurrence.

REFERENCES

Ariane, C., Regula, G. and Danuser, J. (2005). The impact of different housing systems on health and welfare of grower and finisher pigs in Switzerland. Swiss Federal Veterinary Office, Switzerland

Beattie, V.E., O'Connell, N.E., Moss, B.W. (2000): Influence of environmental enrichment on the behaviour, performance and meat quality of domestic pigs. *Livestock Production Science* 65, 71–79

Björklund, L. (2005). Effects of rearing boars and gilts in mixed-or single-sex groups and split-marketing on behaviour, welfare and performance. Linköping: Linköpings universitet—Institute of Technology

Jensen, M. B. and Pedersen, L. J. (2007). The value assigned to six different rooting materials by growing pigs. *Applied Animal Behaviour Science*, 108: 31-44

Jordan D. (2013): Environmental enrichment in intensive production systems for farm animals [PhD Thesis]. Baden-Württemberg, Germany: University of Hohenheim; 2013

Olsen, A. W., Vestergaard, E. M. and Dybkjaer, L. (2000). Roughage as additional rooting substrates for pigs. *Animal Sciences* 70: 451-456

Peterson, V., Simonsen, H.B., Lawson, L.G. (1995): The effect of environmental stimulation on the development of behaviour in pigs. *Applied Animal Behaviour Science* 45, 215–224. pp.73-74

Ramis, G., Gomez, S., Pallares, F. J. and Munoz, A. (2005). Comparison of the severity of esophagogastric, lung and limb lesions at slaughter in pigs reared under standard and enriched conditions. *Animal Welfare*, 14: 27-34

SAS, (2012). Statistical Analytical Software User's Guide. Static version 9.2 Ed. SAS institute Inc. Cary

Scott, K., Taylor, L., Gill, B.P., Edwards, S.A. (2006): Influence of different types of environmental enrichment on the behaviour of finishing pigs in two different housing systems. 1. Hanging toy versus rootable substrate. *Applied Animal Behaviour Science* 99, 222–229.

Spoolder, H. A. M., De Bree, J., Van der Mheen, H. W. and Bracke, M. B. M. (2003). Not animal related but housing parameters determine an experts intuitive welfare assessment of pig farms. In: Ferrante, F., Canali, E., Carenzi, C., Mattiello, S., Minero, M., Palestrini, C., Tosi, M.V., Verga, M. (Eds.), Proceedings of the 37th International Congress of the ISAE, Abano Terme, Italy, 24–28 June

Studnitz, M., Jensen, M. B. and Pedersen, L. J. (2007). Why do pigs root and in what will they root? A review on the exploratory behaviour of pigs in relation to environmental enrichment. *Applied Animal Behaviour Science*, 107: 183-197

Vanheukelom, V., Driessen, B., Maenhout, D. and Geers, R. (2011). Peat as environmental enrichment for piglets: the effect on behaviours, skin lesions and production results. *Applied Animal Behaviour Science*, 134, 42-47

Van de Weerd H.A, Docking C.M, Day J.E.L, Breuer K, Edwards SA.(2006): Effects of species – relevant environmental enrichment on the behaviour and productivity of finishing pigs. *Applied Animal Behaviour Science* 2006;99:230-47.