

Effect of Weaning Age on growth Performance and Feed Conversion Efficiency of Large White Yorkshire (LWY) Piglets under Intensive System of Management in Mizoram

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ABSTRACT

The study was for assessment of weaning age on growth performance and feed conversion efficiency of LWY piglets under intensive system of management in Mizoram. The study was conducted on piglets from twelve LWY sows. The sows were selected based on parity, sire mated, litter size and weight, and divided into three homogenized groups with 4 sows in each group (T₁, T₂ and T₃). Piglets of T₁ group were weaned at 28 days, of T₂ at 35 days and of T₃ at 42 days of age. The weaned piglets were reared up to 77th days of age. The animals were reared under intensive system of management following standard feeding and managerial norms. The average body weight of piglets weaned at 28th and 35th day of age were found to be significantly (P<0.05) higher than the body weights of piglets weaned at 42nd day of age. The body weight gain of the early weaned piglets was observed to be higher than the late weaned piglets. The average total body weight gain at 77th day of age was found to be 19.11, 17.72 and 16.60 kg, respectively for piglets weaned at 28th, 35th and 42nd day age. Feed conversion efficiency at 77th day of age was recorded as 2.32±0.16, 2.44±0.19 and 2.48±0.07 indicated that early weaned piglets performed well under the same feeding and managerial situation. From the findings of the study, it was concluded that weaning at 28th day of age may be recommended for LWY piglets under intensive management in Mizoram.

Keywords: Weaning age, LWY piglets, growth, feed conversion efficiency, Mizoram.

I. INTRODUCTION

Pig husbandry ensures livelihood to millions of rural people in India. In recent years, adoption of improved managerial practices has increased the efficiency of pig production throughout the world. Amongst the various improved managerial tools, weaning at an early age is one common practice which helps to improve pig production efficiency.

Weaning at an early age minimizes body weight losses of the sows during lactation, and ensures early

rebreeding of the sows increasing the numbers of piglets produced per sow per year [1,2]. Early weaning also reduces expenditure on labour and housing [3]. Weaning of piglets between 10 to 35 days of age is an adopted practice in many developed countries. However, in India, weaning is usually done at 56 days of age.

Considering manifold advantages of early weaning, and the vital roles played by pig husbandry for livelihood and nutritional security, the present study was undertaken to elucidate the effects of weaning age on growth performance and feed conversion efficiency of

Large White Yorkshire (LWY) piglets managed under intensive system in Mizoram.

II. METHODS AND MATERIAL

Ethical approval: Necessary approval has been taken from the Institutional Animal Ethic Committee for conducting the study.

Location of the Study

The study was conducted at the Piggery Unit of the Instructional Livestock Farm Complex (ILFC), College of Veterinary Sciences and Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram during 2013-2014.

Experimental design

Piglets from 12 LWY sows were utilized for the study. Based on parity, litter size and weight, and sire mated, twelve (12) LWY sows of 2nd and 3rd parity with litters were selected and divided into three homogenized groups of 4 sows in each group (T₁, T₂ and T₃). Piglets of T₁ group were weaned at 28 days, of T₂ at 35 days and of T₃ at 42 days of age. The weaned piglets were reared to 77th days of age.

Management and feeding

The piglets of treatment groups were reared in the creep area of the farrowing pen before weaning. Adequate care was taken to minimize thermal discomfort to young piglets. Strict hygiene was maintained during creep rearing period. Routine management practices like naval cord cutting, teeth clipping, iron injection, etc. were done following standard protocols. After weaning, piglets were shifted to weaner pen fitted with heating device.

Balanced rations [4] were prepared incorporating conventional feed ingredients. Piglets irrespective of groups were provided pre-starter *ad libitum* during 3rd week of age, starter feed during 4th to 6th week and grower feed from 7th to 11th week of age. Pre-starter and starter ration were fortified with milk powder, sugar, probiotic, zinc oxide, antibiotic, lysine, and methionine.

Data collection

Feed consumption of experimental piglets was recorded individually on daily basis. Body weight records of

piglets were made at weekly interval from birth to 11 weeks (77 days) of age. Total expenditure on management and feeding per kg live weight was calculated.

Statistical Analysis

The data generated were statistically analyzed as per Snedecor & Cochran [5].

III. RESULT AND DISCUSSION

Ingredient and nutritional composition of the experimental rations

The rations fed to the piglets, based on age irrespective of treatment groups, are presented in table 1. The nutritional compositions of the rations are presented in table 2. Based on the retail market prices of the feed ingredients, the expenditure on per kg pre-starter, starter and grower ration were calculated as Rs. 52.80, 43.26 and 39.60, respectively.

Feed consumption

The average Daily Feed Intake (ADFI) is presented in Table 3. The ADFI were found to be low during 3rd and 4th weeks of age in all the groups. Post-weaning feed intakes were gradually increased in all groups up to 11th weeks of age. Less feed intake during the early age might be for availability of milk consumption. Post weaning ADFI was higher in late weaned piglets as compared early weaned piglets, but was non-significant (P<0.05) among the groups.

Table 1 : Ingredient composition of the rations fed to the piglets before and after weaning

Ingredients (kg)	Pre-starter	Starter	Grower
Maize	48.8	52.8	58.3
Soy Bean Meal	25	25	20
Ground Nut Cake	5	5	7
Wheat Bran	2	5	5
Fish meal	8	5	5
Skim milk powder	5	1	0
Sugar	1	1	0
Soybean oil	2	2	1.5
DL_methionine	0.15	0.15	0.15
L-Lysine	0.3	0.3	0.3
Mineral Mixture	2	2	2
Di-Cal-Phos	0.2	0.2	0.2
Zinc Oxide	0.2	0.2	0.2
Tonakind Gold (Probiotic)	0.1	0.1	0.1
Agnuцин (Antibiotic)	0.025	0.025	0.025

Salt	0.3	0.3	0.3
Total (kg)	100	100	100
Cost** (Rs./kg)	52.80	43.26	39.60
** Based on market price of ingredients at Aizawl City, Mizoram, India during 2013-2014			

Table 2 : Nutritional composition^{###} (on DM basis) of the rations fed to the piglets before and after weaning

Nutrient	Pre-starter	Starter	Grower
Dry Matter (%)	87.61	87.31	87.05
Energy(DE)(Kcal/kg)	3306	3308	3287
Crude Protein (%)	21.94	20.03	19.02
Crude Fibre (%)	3.85	4.21	4.21
Lysine (%)	1.51	1.31	1.19
Methionine (%)	0.57	0.50	0.48
Methionine + Cystine (%)	0.90	0.83	0.80
Calcium (%)	0.96	0.84	0.81
Phosphorus (%)	0.74	0.69	0.69
Ether Extract (%)	5.68	5.71	5.17
## Calculated value.			

The higher post weaning feed consumption as compared to low pre-weaning feed intake in all the groups signified that there might be inhibitory effect of lactation on creep feed consumption of piglets. Kuller *et al.* [6] demonstrated that both pre and post weaning feed intake were higher for the intermittent sucker than the continuous sucker during lactation. Sulabo *et al.* [7] on the other hand suggested that limited nutrient supply did not drive piglets to consume more creep feed. Lower feed intake might have contributed to low growth rates for lately weaned piglets as compared to early weaned piglets. The present findings are in agreement with the findings of Fraser *et al.* [8] and Kuller *et al.* [6].

Table 3 : Average daily feed intake (g) of the piglets under study.

Age in week	Treatment group			p-value
	T-1	T-2	T-3	
3 rd	19.45±2.3 3	17.29±0.8 0	21.05±1.81	0.361
4 th	61.22±8.4 8	51.87±8.2 4	62.15±5.20	0.579
5 th	178.96±34 .07 ^a	97.20±8.1 1 ^b	88.46±5.16 ^b	0.022
6 th	300.86±21 .63 ^a	214.08±22 .83 ^b	128.53±5.01 c	0.000
7 th	481.10±12 .63 ^a	349.08±26 .53 ^b	289.28±31.6 4 ^b	0.001
8 th	645.12±71 .40	607.84±10 6.09	513.64±32.0 4	0.482
9 th	859.05±14 3.05	746.05±13 2.87	656.39±66.4 1	0.509
10 th	1074.64±1 27.21	1032.84±1 83.65	907.87±49.5 5	0.662
11 th	1369.88±1 10.64	1357.65±1 50.74	1253.47±92. 11	0.760

Means within each row bearing at least one common superscript do not differ significantly (P < 0.05)

Growth Performance of Piglets

The average weekly body weights of the piglets before and after weaning are presented in table 4. No significant (P<0.05) differences were observed in body weights of piglets under different weaning regime up to 6 weeks of age. However, it was observed that body weights of piglets weaned early were higher than the late weaned piglets and at 11th week of age, average body weight of piglets weaned at 28th and 35th day of age were found to be significantly (P<0.05) higher than the body weights of piglets weaned at 42nd day of age.

Table 4 : Average weekly body weights (kg) of the piglets under study.

Age in week	Treatment group			p-value
	T-1	T-2	T-3	
At Birth	1.42±0.05 (34)	1.39±0.04 (36)	1.36±0.04 (33)	0.650
1 st	2.49±0.09 (34)	2.28±0.20 (35)	2.45±0.08 (33)	0.130
2 nd	3.74±0.15 (33)	3.64±0.13 (33)	3.70±0.11 (33)	0.158
3 rd	4.88±0.16 (32)	4.67±0.15 (31)	4.70±0.17 (33)	0.656
4 th	5.67±0.19 (32)	5.55±0.14 (31)	5.63±0.20 (33)	0.895
5 th	6.21±0.19 (32)	6.65±0.17 (31)	6.63±0.24 (33)	0.242
6 th	7.52±0.23 (32)	7.31±0.19 (31)	7.38±0.27 (32)	0.813
7 th	9.32±0.32 a (32)	8.33±0.24 ^b (31)	8.53±0.30 ab (31)	0.043
8 th	11.52±0.3 7 ^a (32)	10.45±0.35 ^b (31)	9.92±0.39 b (31)	0.010
9 th	13.87±0.4 9 ^a (32)	12.94±0.47 ^a b (31)	12.07±0.4 4 ^b (31)	0.027
10 th	17.05±0.6 3 ^a (32)	15.86±0.56 ^a b (31)	14.88±0.6 0 ^b (31)	0.039
11 th	20.53±0.6 8 ^a (32)	19.11±0.70 ^a b (31)	17.96±0.7 5 ^b (31)	0.041

Means within each row bearing at least one common superscript do not differ significantly (P < 0.05).

The average daily gain in body weight (ADG) of piglets under different weaning regime was found to be variable (table 5). However, growth rate of the early weaned piglets was higher than the late weaned piglets. The average total body weight gain at 77th day of age was significantly higher for piglets weaned at 28th day of age than piglets weaned at 35th and 42nd day of age respectively. Similarly, average total body weight gain of piglets weaned at 28th and 35th day of age was found to be higher than piglets weaned at 42nd day of age.

Table 5. Average daily gain in body weights (g) of the piglets under study

Age in week	Treatment group			p-value
	T-1	T-2	T-3	
1 st	153.28±6.76 ^a	123.51±7.39 ^b	119.44±9.26 ^b	0.005
2 nd	173.59±12.82 ^a	188.05±11.0 ^{5ab}	214.59±10.2 ^{9^b}	0.041
3 rd	155.00±9.30	135.58±7.67	142.94±10.0 ²	0.322
4 th	113.84±12.30	123.96±9.96	132.90±8.80	0.432
5 th	76.79±7.78 ^a	155.76±7.54 ^b	141.90±8.48 ^b	0.000
6 th	186.70±15.88 ^a	65.99±14.48 ^b	140.54±14.6 ^{4^c}	0.000
7 th	257.86±19.54 ^a	146.45±18.9 ^{1^b}	102.58±10.5 ^{4^b}	0.000
8 th	314.29±19.00 ^a	302.53±17.9 ^{1^a}	199.08±17.6 ^{4^b}	0.000
9 th	334.91±25.48	355.81±34.1 ⁴	305.30±25.7 ⁰	0.463
10 th	455.09±27.88	418.16±20.5 ¹	403.46±27.2 ²	0.337
11 th	496.79±19.99	463.46±28.6 ²	440.09±29.1 ⁴	0.307

Means within each row bearing at least one common superscript do not differ significantly (P < 0.05)

In all the groups, ADG was observed to increase from 1st to 2nd week and thereafter decreased during 3rd and 4th week of age. ADGs were found to increase in 5th week in 35 & 42 days weaning group. During 1st week of post weaning, ADGs in all the groups were reduced. This might be for post weaning growth depression which persisted for one or two weeks after weaning. Similar trends were also reported by Bhatia *et al.* [3], Mahan [9], Abraham [10], and Phukan [11].

Reduced ADGs during 3rd and 4th week of age might be due to lower milk availability and/or less consumption of pre-starter ration by the piglets. Milk production of sows usually decline after 3rd week of lactation which increases the gap between supply and demand of nutrients for nursing piglets [2]. Digestibility of uncooked feeds was reported to be low in young piglets [12]. The pre-starter rations provided during the experiment were uncooked ones which might contribute to poor intakes and hence decreased growth of young piglets during their early life as also the piglets needs to be adopted to the ration.

Feed conversion efficiency (FCE)

The overall FCE was found to be better in early weaned pigs than the late weaned counterpart (table 6). However, there was no statistical (P<0.05) differences among the weaning groups under the study. Better growth rate of

early weaned piglets might result better FCE than the lately weaned piglets. The present findings are in confirmation with the results of Rava [13], Abraham [10], Collins *et al.* [14], Phukon [11], and Suryanarayana and Suresh [15].

Table 6 : Average feed conversion efficiency of piglets under study

Age in week	Treatment group			p-value
	T-1	T-2	T-3	
5 th	2.45 ± 0.19	-	-	-
6 th	1.66 ± 0.26 ^a	3.26± 0.39 ^b	-	0.007
7 th	1.88±0.16	2.32±0.21	2.83±0.52	0.199
8 th	2.07±0.19	2.05±0.12	2.54±0.22	0.158
9 th	2.65±0.48	2.08±0.20	2.18±0.15	0.418
10 th	2.33±0.25	2.50±0.29	2.28±0.13	0.794
11 th	3.01±0.19	2.96±0.26	2.89±0.13	0.916
Overall	2.32±0.16	2.44±0.19	2.48±0.07	0.753

Means within each row bearing at least one common superscript do not differ significantly (P < 0.05)

IV. CONCLUSION

From the findings of the present study, it was concluded that weaning age of 28th day may be recommended for LWY without any adverse effects on growth performance and feed conversion efficiency when reared under intensive system of management in Mizoram.

V. ACKNOWLEDGEMENT

Authors are thankful to the Dean, College of Veterinary Sciences & A.H., Central Agricultural University, Selesih, Aizawl, Mizoram, India for providing financial support and necessary facilities to carry out the study successfully.

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