

EFFECT OF WEANING MANAGEMENT ON PERFORMANCE OF GROWING FINISHING CROSSBRED (TAMWORTH X DESI) PIGS UNDER FARM CONDITION OF ASSAM

G. KALITA¹, R. ROYCHOUDHURY², D. KALITA³, B.N. SAIKIA⁴, J. SAHARIA⁵, M. BORA⁶
AND L. BORA⁷

Department of Livestock Production and Management, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, Assam 781 022, INDIA

Received: 4 Sept., 2016; Accepted: 6 Oct., 2016

ABSTRACT

The present study was carried out on 24 growing finishing crossbred (Tamworth x Desi) pigs maintained at All India Coordinated Research Project on Pig (under Mega Seed Project), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam. Six castrated grower pigs of average body weight (25.88 kg) at the end of rearing period (13 weeks of age) were selected from the litters of 5 sows (at least one grower pig per litter) which were weaned at 28 days of age. Similarly, 18 other castrated grower pigs (six per weaning group) were selected from the litters of 15 sows (5 sows in each weaning group) which were weaned at 35, 42 and 56 days of age. The selected pigs were reared individually and reared under farm condition till the end of slaughter age (34 weeks of age). All the experimental animals were fed to the appetite on concentrate rations prepared as per the standards given by NRC (1998). Pigs weaned early (28 or 35 days), having significantly ($P < 0.05$) higher body weight at the beginning of the growing period (week 14) used to grow fast and their superiority in body weight continued till slaughter (at 34 weeks) compared to late (42 or 56 days) weaned pigs. Average daily gain (ADG) taken at 4 weekly intervals were increased up to 21 weeks of age and thereafter it declined for all pigs under different weaning groups and overall ADG during the growing finishing period (end of 13th to 34th weeks) were numerically higher in pigs weaned early. Data of feed conversion efficiency (FCE) of growing-finishing pigs revealed non-significant ($P < 0.05$) difference among the different weaning groups throughout the different periods of growth.

Key words: Average daily gain, Body weight, Crossbred pig, Feed conversion efficiency, Weaning.

Improvement in resource use efficiency is one of the important key components of sustainable

- 1 Corresponding author: Department of Livestock Production and Management, College of Veterinary Sciences and Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram & E-mail: gkgirin69@gmail.com
- 2 Prof. and Head, Department of Livestock Production and Management, C.V.Sc., A.A.U., Khanapara, Guwahati, Assam
- 3 Principal Scientist, AICRP on Pig, C.V.Sc., A.A.U., Khanapara, Guwahati, Assam
- 4 Prof. and Head, Department of Animal Nutrition, C.V.Sc., A.A.U., Khanapara, Guwahati, Assam
- 5 Professor, Department of Livestock Production and Management, C.V.Sc., A.A.U., Khanapara, Guwahati, Assam
- 6 Professor, Department of Livestock Production and Management (Biostatistics), C.V.Sc., A.A.U., Khanapara, Guwahati, Assam
- 7 Department of Veterinary Extension Education, C.V.Sc., A.A.U., Khanapara, Guwahati, Assam

pig production system. Different management practices were developed to improve the resource use efficiency in pig production system in the last few decades and practice of early weaning is one such management tool, which helps to improve the pig production efficiency. Early weaning provide the opportunity to exploit the higher growth potential of young piglets by providing easily digestible nutrients, as sow milk production becomes limiting to the suckling piglet from 8-10 days of age and the difference between need and supply of nutrients progressively increases as lactation proceeds⁴. Compared to the piglets having low body weight, piglet of higher body weight at the end of rearing period (11 to 13 weeks of age) continued to grow

fast during growing finishing periods and reached the slaughter weight early⁷.

For successful early weaning management of piglets at 21 to 35 days of age, quality feed, water and suitable microclimate is essential. Inability to provide these requirements resulted in delay in weaning age of piglets up to 56 days in most of the pig farms in India, which resulted in considerable economic losses and might be one of the limiting factors of non-availability of industrialized pig farms in India, unlike other developed countries. In our previous experiment, it was observed that early weaned (28 and 35 days) piglets weigh higher than their late weaned (42 and 56 days) counterpart at the end of rearing period i.e. 13th weeks of age⁵. The present study was conducted to see whether the superiority of growth rate of early weaned piglets continued till the end of slaughter age (34 weeks) or not.

MATERIALS AND METHODS

The experiment was carried out on 24 weaned growing finishing pigs born from 20 crossbred (Tamworth x Desi) sows maintained at All India Coordinated Research Project on Pig (Mega Seed Project), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam. Six castrated grower pigs of average body weight (25.88 kg) at the end of rearing period (13 weeks of age) were selected from the piglets of 5 sows (at least one grower pig per litter), which were weaned at 28 days of age. Similarly, 18 other castrated grower pigs (six per weaning group) were selected from the litters of other 15 sows (5 sows in each weaning group), which were weaned at 35, 42 and 56 days of age, with average body weights of 23.97, 21.03 and 19.00 kg respectively. Pigs so selected were reared individually till the end of slaughter age (34 weeks of age). All the experimental animals were fed to the appetite on concentrate rations (Table-1), which were prepared as per the standards given by¹¹. The dry matter content of the feed given and residue left were estimated at weekly intervals. However, for wet residues, estimation was carried out immediately using hot air oven. The daily voluntary feed intake was estimated after

making correction for dry matter in feed as well as in residue. All the piglets were weighed in morning before giving feed during experiment period (end of 13 weeks to 34 weeks of age) at four weekly intervals. Average daily gains (ADG) $(w_2 - w_1) / (t_2 - t_1)$ for various stages were calculated, where w_1 and w_2 are the initial and final body weights of pigs for a particular period and t_1 and t_2 are the corresponding time units. Feed conversion efficiency (FCE) at four weekly intervals was calculated to compare among the groups. However the final weight, ADG and FCE was taken at the interval of 5 week (week 30 to week 34).

Data were analyzed using the SPSS 16.0 by applying one way ANOVA followed by Fisher's Least Significant Difference Test for posthoc multiple comparisons to evaluate the effect of different weaning age groups on growth parameters¹³.

RESULTS AND DISCUSSION

Results of body weight, Average Daily Gain (ADG) and Feed Conversion Ratio (FCR) under different weaning system have been presented in the Table 2.

Body weight

It was observed that advantage of higher initial body weights at the beginning of 14th week (or at the end of 13th week) of the pigs under 28 and 35 days weaning groups persisted during the entire growing-finishing (14 -34 week) stage over the pigs weaned at 42 and 56 days of age. The mean body weight at the end of 34th week of age for the finisher pigs under 28 days weaning (105.00 ± 2.93 kg) was significantly ($P < 0.05$) higher as compared to finishers of 56 days weaning group (91.50 ± 3.57 kg). However, despite numerical superiority for early weaned pigs, no significant ($P < 0.05$) differences were observed among the body weights of finisher pigs under 35 (99.33 ± 2.49 kg) and 42 (95.50 ± 2.68 kg) group. Similar advantages of early growth on final weights of growing-finishing pigs were reported by^{7, 6, 8}. The present findings of body weight of T&D pigs at the end of 34 weeks for all the weaning groups were much higher than the body weights (68.17 kg) for T&D pigs at 8 months of age as reported by¹, which

might be due to variations in agro-climatic regions and due to the feeding and other managerial factors adopted during rearing.

Average daily gain (ADG)

The data revealed that the overall ADG of growing finishing pigs under 28 days (538.21 ± 13.96 g) and 35 days (512.70 ± 17.69 g) weaning groups were numerically higher as compared to the pigs under 42 (506.58 ± 16.94 g) and 56 (493.20 ± 19.61 g) days weaning groups. However, the differences were non-significant ($P < 0.05$) among the different weaning groups which might be due to wide variations of ADGs within the group and because of low sample size (6 animals) per weaning group.

The present findings were in agreement with ^{7,6,8}, who reported higher ADG during growing-finishing pigs which were weaned with higher body weights compared to their lower weight counterparts.

The pattern of ADG growth rates during different periods of growth from 14 to 34 weeks of growing-finishing pigs presented in the Table 2, revealed that the ADG increased up to 21 weeks of age and thereafter it declined for all pigs under different weaning groups. Growth rate of ADG in pigs rapidly increased from 1st to 3rd month of age and thereafter it becomes static or increases at very slow rate up to 6 months and thereafter it declined slowly¹⁵. The trend of ADG growth rates observed in the present study was well supported by the reports of ¹⁵.

Feed conversion efficiency (FCE)

Data of FCE of growing-finishing pigs (Table 2) revealed non-significant ($P < 0.05$) difference among the different weaning groups throughout the different periods of growth. There were only numerical superiority of FCE of finisher pigs of early weaned groups i.e. 28 days weaning (3.99 ± 0.06) and 35

days weaning (3.91 ± 0.05) groups, which might be because of higher growth rates of the finisher pigs compared to lately weaned pigs i.e. at 42 days (4.07 ± 0.08) and 56 days (4.09 ± 0.10) of age. The FCE of present study were in agreement with the findings of ^{9,10,2}, whereas poor FCE as compared to the present results were reported by ^{17,3}. However, much better FCE than the present findings were mentioned by ^{14,12}. Differences in FCE with the present findings might be because of differences in breed, feeding and management practices. From the data of FCE of the present study, it is clear that, as the age progressed, the FCE also got increased in all the weaning groups, which are in agreement with the findings of ^{7,16,12}.

The gap between supply and demand of nutrients in suckling piglets starts as early as 8 days of age, and it widened further when milk production of sow started to decline from 3rd week of lactation⁵. For better growth, external supply of nutrients (apart from sow milk), is essential when piglets are still nursing the mother. However, consumption of solid feeds during nursing is highly variable and availability of sow milk (in lactation) inhibits it. Therefore, weaning at an early age 28-35 day (instead of traditional 56 days under Indian condition) with proper housing and feeding, provides opportunity for exploitation of higher growth potential of young pigs and this hypothesis was found to be positive in our previous experiment⁵. With the advancement of age, fat deposition exceeds the rate of lean deposition, resulting poor feed efficiency. As growth rate of ADG in pigs after 3 months of age is static or increases at very slow rate up to 6 months, the early weaned (28 days age) pigs, which had higher body at the end rearing (3months), maintains its superiority till slaughter age (34 weeks) compared to late weaned counterparts.

Table 1. Composition of different rations used in the experiment

Sl. No.	Rations→		Grower II	Finisher I	Finisher II
	Age in weeks rations were fed→		14-17	18-27	28-34
A.	Ingredients	Cost/kg	Parts (%)	Parts (%)	Parts (%)
	Maize	11.24	66.4	75.6	75.6
	SoybeanMeal	27.97	10	6	5
	Ground Nut Cake	25.37	10	9	6
	Wheat Bran	11.95	3	2	9
	Fish meal	21.95	7	5	2
	Soybean oil	78.02	1	0	0
	Methionine	520.00	0.1	0	0
	Lysine	280.00	0.25	0.1	0.1
	Mineral Mixture	90.00	2	2	2
	Salt	5.47	0.25	0.3	0.3
	Total		100	100	100
B.	Cost of ration per kg (Rs.)		18.51	15.89	15.03
C.	Nutrient Contents (calculated)				
	Dry Matter (%)		86.79	86.58	86.58
	Energy (DE) (Kcal/kg)		3310.02	3294.72	3290.72
	Crude Protein (%)		17.54	15.17	13.00
	Crude Fibre (%)		3.86	3.48	3.80
	Lysine (%)		1.02	0.72	0.56
	Methionine (%)		0.43	0.30	0.25
	Methionine + Cystine (%)		0.72	0.55	0.47
	Calcium (%)		0.91	0.85	0.77
	Phosphorus (%)		0.72	0.69	0.68
	Ether Extract (%)		4.57	3.53	3.44

Table 2. Mean (\pm SE) of Body Weights (in Kilogram), Average daily gain (in Gram) and Feed conversion efficiency (FCE) of Growing Finishing crossbred Pigs under different weaning system

Age (week) at the end of	Weaning Groups			
	Body weights of growing finishing pigs (kg)			
	28 days (T ₁)	35 days (T ₂)	42 days (T ₃)	56 days (T ₄)
13 th	25.88 \pm 0.91 ^a	23.97 \pm 1.29 ^{ab}	21.03 \pm 1.60 ^{bc}	19.00 \pm 2.07 ^{cd}
17 th	40.92 \pm 1.32 ^a	39.58 \pm 1.31 ^{ab}	37.08 \pm 1.75 ^{ac}	34.17 \pm 2.10 ^{cd}
21 st	58.75 \pm 1.42 ^a	55.50 \pm 1.54 ^{ab}	53.08 \pm 1.74 ^{bc}	49.75 \pm 2.21 ^{cd}
25 th	75.08 \pm 2.13 ^a	70.92 \pm 1.51 ^{ab}	68.00 \pm 2.21 ^{bc}	64.92 \pm 2.52 ^{bcd}
29 th	89.92 \pm 2.44 ^a	84.92 \pm 1.44 ^{ab}	81.97 \pm 2.38 ^{bc}	79.17 \pm 2.81 ^{bcd}
34 th	105.00 \pm 2.93 ^a	99.33 \pm 2.49 ^{ab}	95.50 \pm 2.68 ^{bc}	91.50 \pm 3.57 ^{bcd}
Age (weeks)	Average daily gain (g)			
14-17	572.62 \pm 16.87	557.74 \pm 3.57	557.74 \pm 16.67	541.67 \pm 6.94
18-21	601.19 \pm 7.53	568.45 \pm 23.70	571.429 \pm 23.96	556.55 \pm 16.25
22-25	583.33 \pm 25.53	550.60 \pm 16.25	550.60 \pm 26.25	541.67 \pm 25.53

26-29	529.76±13.57	500.00±20.10	498.81±12.43	508.93±21.00
30-34	430.95±14.48	411.90±40.14	386.67±14.03	352.38±29.89
14-34	538.21±13.96	512.70±17.69	506.58±16.94	493.20±19.61
Age (weeks)	Feed conversion efficiency (FCE)			
14-17	2.74±0.06	2.91±0.08	2.83±0.15	2.94±0.07
18-21	2.99±0.09	3.20±0.03	3.29±0.14	3.27±0.12
22-25	3.70±0.15	3.55±0.07	3.78±0.12	3.80±0.18
26-29	4.54±0.06	4.30±0.12	4.45±0.08	4.34±0.07
30-34	6.26±0.10	5.95±0.33	6.41±0.17	6.61±0.24
14-34	3.99±0.06	3.91±0.05	4.07±0.08	4.09±0.10

Values (Mean±SE) bearing at least one common superscript within each row do not differ significantly ($P < 0.05$)

CONCLUSION

Pigs weaned early with significantly ($P < 0.05$) higher body weight at the beginning of the growing period (week 14) grew fast and their superiority in body weight continued till slaughter age (at 34 weeks). ADG were increased from 13th week to 21st weeks of age and thereafter it declined up to 34th week for all pigs under different weaning groups and overall ADG during the growing finishing period (end of 13th to 34th weeks) were numerically higher in pigs weaned early. Data of FCE of growing-finishing pigs revealed non-significant ($P < 0.05$) difference among the different weaning groups throughout the different periods of growth. From the present study, it can be concluded that pigs having higher body weight at the end of rearing period (3 months of age), maintain its higher growth rate throughout the growing finishing period (14 to 34 weeks of age) compared to lower body weight pigs and management tool like early weaning may be adoptive to achieve better body weight gain compared to late weaning of pigs at 42 or 56 days of age. However, further research with more sample size will be helpful to reaffirm the present results.

ACKNOWLEDGEMENT

The authors are highly thankful to AICRP on pig for financial help and the Dean, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, Assam for providing the facilities to carry out this research work.

REFERENCES

1. Anon 2011. Annual Report 2009-10 and 2010-11 on AICRP and Mega Seed Project on Pig,

National Research Centre on Pig, ICAR, Rani, Guwahati, : 25-34.

2. Bharathidhasan, A., Baegan, S., Narayanan, R., Gopu, P., Subramanian, A., Narendrababu and Prabakaran, R. 2010. Effect of non-starch polysaccharides (NSPS) degrading enzyme supplementation on performance of pigs. *Tamilnadu J. Veterinary & Animal Sciences*, **6** (6): 280-285.
3. Gopinathan, A. and Pusha, A. 2010. Post-weaning production in Large White Yorkshire, Desi and their crossbreds Pigs: Economic Appraisal. *Indian J. Anim. Res.*, **44**(2):147-149.
4. Harrell, R.J., Thomas, M.J. and Boyd, R.D. 1993. Limitations of sow's milk yield on baby pig growth. *Cornell Nutrition Conference for Feed Manufacturers* :156-164. Cornell University, Ithaca, NY.
5. Kalita G., Roychoudhury R., Kalita D., Saikia B.N., Saharia J., Bora M., Bora L. and Talukdar D.J. 2016. Growth performance of T&D (Tamworth X Desi) pigs at early weaning under agro climatic condition of Assam. *Int. J. Agr. Sci.*, **8**(52): 2224-2227.
6. Klindt, J. 2003. Influence of litter size and creep feeding on preweaning gain and influence of preweaning growth on growth to slaughter in barrows. *J Anim Sci.*, **81**: 2434-2439.
7. Mahan, D.C. 1993. Effect of weight, split-weaning, and nursery feeding programs on performance responses of pigs to 105 kilograms body weight and subsequent effects on sow. *J Anim Sci.*, **71**: 1991-1995.

8. Main, R.G., Dritz, S.S., Tokach, M.D., Goodband, R.D. and Nelssen, J.L. 2004. Increasing weaning age improves pig performance in a multisite production system. *J Anim Sci.*, **82**: 1499-1507.
9. Medhi, D., Nath, N.C., Gohain, A.K. and Bhuyan, R. 2009. Effect of silk worm pupae meal on carcass characteristics and composition of meat in pigs. *Indian Vet. J.*, **86**(8): 816-818.
10. Murugan, M., Mathew, J., Saseendran, P.C., Xavier, F. and Kannan, A. 2009. Growth and carcass traits of duroc x (large white yorkshire x landrace) pigs under different feeding regimes. *Indian J. Anim. Res.*, **43** (1): 27-31.
11. National Research Council (NRC) 1998. Nutrient requirements of swine, Tenth revised edition, Subcommittee on Animal Nutrition, Board on Agriculture, National Research Council, National Academy Press-2101 Constitution Avenue, NW-Washington, DC. 20418, USA.
12. Oliveira, de G.C., Moreira, I., de Souza, A.L.P., Murakami, A. E., Parra, A.R.P., Carvalho, P.L. de O. and Maicon, D.B. 2011. Corns with Different Nutritional Profiles on Growing and Finishing Pigs Feeding (30 to 90 kg). *Asian-Aust. J. Anim. Sci.*, **24** (7): 982 - 992.
13. Snedecor, G.W. and Cochran, W.G. 1994. Statistical methods. 8th edn. Iowa State University Press, USA.
14. Whitney, M.H., Shurson, G.C., Johnston, L.J., Wolf, D.M. and Shanks, B.C. 2006. Growth performance and carcass characteristics of grower finisher pigs fed high quality corn distiller dried grain with solubles originating from modern Mid western ethanol plant. *J. Anim. Sci.*, **84**: 3356-3363.
15. Whittemore C.T. 1998. The science and Practice of Pig Production, Reproduction. 2nd edn, pp.91-130. Blackwell Science Ltd, Oxford UK.
16. Wolter, B.F., Ellis, M., Corrigan, B.P. and De Decker, J.M. 2002. The effect of birth weight and feeding of supplemental milk replacer to piglets during lactation on preweaning and postweaning growth performance and carcass characteristics. *J. Anim. Sci.*, **80**: 301-308.
17. Yedukondalu, R., Rao, D.S. and Ravi, A. 2006. Effect of floor space on the performance of crossbred grower pigs. *Indian Vet. J.*, **83**(1): 106-107.