



Research Article

GROWTH PERFORMANCE OF T&D(TAMWORTH X DESI)PIGS AT EARLY WEANING UNDER AGRO CLIMATIC CONDITION OF ASSAM

KALITA G.^{1*}, ROYCHOUDHURY R.², KALITA D.³, SAIKIA B.N.⁴, SAHARIA J.⁵, BORA M.⁶, BORA L.⁷ AND TALUKDAR D.J.⁸

¹Department of Livestock Production Management, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih, Aizawl, 796014, Mizoram

^{2,5,6}Department of Livestock Production Management, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, 781022, Assam

³AICRP on Pig, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, 781022, Assam

⁴Department of Animal Nutrition, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, 781022, Assam

⁷Department of VEE, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahati, 781022, Assam

⁸Department of ARGO, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih, Aizawl, 796014, Mizoram

*Corresponding Author: Email-gkgirin69@gmail.com

Received: August 17, 2016; Revised: September 01, 2016; Accepted: September 04, 2016; Published: October 30, 2016

Abstract- The experiment was carried out on 182 T&D (Tamworth x Desi) crossbred piglets born to 20 sows of 2nd and 3rd parity at AICRP on Pig, College of Veterinary Science, Assam Agricultural University, Khanapara, Assam, India. The 20 sows along with their piglets were divided to four groups (T₁-28 days, T₂-35 days, T₃-42 days and T₄-56 days weaning age), in a manner that each group was represented by almost similar litter size at birth and of similar parity sows. To randomize sire effect, litters belonging to same sire were distributed in all the four groups. Piglets of all the weaning groups were individually identified at birth and reared up to 13 weeks of age and daily feed intake and weekly body weights were recorded. The results revealed that body weights at 13 weeks of age and average daily gain from birth to 13 weeks of age were significantly ($P<0.05$) higher for the piglets weaned at 28 and 35 days of age with better feed conversion efficiency and average daily feed intake compared to piglets weaned at 42 and 56 days of age. In conclusion, the weaning management at 28 or 35 days of age with quality pre-starter and starter ration for piglets might be advantageous as compared to weaning management at 42 or 56 days of age.

Keywords- Weaning, T&D pigs, Body weight, Average daily gain, Feed conversion efficiency

Citation: Kalita G., et al., (2016) Growth Performance of T&D (Tamworth X Desi) Pigs at Early Weaning Under Agro Climatic Condition of Assam. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 8, Issue 52, pp.-2524-2527.

Copyright: Copyright©2016 Kalita G., et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Dr Deepak Deka

Introduction

Early weaning is one the important managemental tool which helps immensely to improve the pig production efficiency by facilitating early rebreeding of sows. It also provides the opportunity to exploit better growth potential of young piglets by providing easily digestible nutrients, as sow milk production is not sufficient to provide all the nutrient required for growth to the suckling piglet from 8-10 days of age and the difference between need and supply of nutrients progressively increases as lactation proceeds [1]. On the grounds of sow and piglet biology, weaning of piglets between 24 and 32 days is optimum [2] and weaning between 20 to 28 days of age is a well adopted practice in most of the developed countries all over the World. However, in India, weaning is still mostly practiced between 42 to 56 days of age, which may cause considerable losses in terms of sow performances as well as pre and post weaning growth rates of piglets. The present work was therefore undertaken to study the growth performance of piglets under different weaning age.

Materials and Methods

Ethical Approval

The present investigation was carried out after the approval of the Institutional Animal Ethics Committee (No. 770/ac/CPCSEA/F.V.Sc./AAU/IAEC/123).

Selection and maintenance of the animals

The experiment was carried out on 182 piglets born to 20 T&D (Tamworth x Desi) sows maintained at the pig farm under the All India Co-ordinated Research Project on Pig (AICRP), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, Assam. The 20 sows along with their piglets were divided into four groups in such a manner that each group was represented by almost similar litter size at birth. Piglets under treatment group T₁, T₂ and T₃ were weaned at 28, 35 and 42 days of age respectively and piglets under control group T₄ were weaned at 56 days of age. Two weeks before farrowing, pregnant sows were transferred to farrowing pen fitted with creep box. Piglets were individually identified just after birth and the needle teeth of each piglet were clipped within 24 hours of farrowing. After weaning at respective age, piglets were reared in weaner pens up to 13th weeks of age. Routine managemental practices were followed from birth to 13 weeks of age for the all piglets under different weaning groups. Different rations were formulated as per standards given by [3] for feeding of experimental animals as shown in [Table-1].

Recording of the Data

All the piglets were weighed in morning before giving feed from birth to 13th week of age at weekly interval. Average daily gains $(w_2-w_1)/(t_2-t_1)$ for various stages were calculated, where w_1 and w_2 were the initial and final body weights of piglets for a particular period and t_1 and t_2 were the corresponding time units. The daily voluntary feed intakes were estimated after making correction for dry matter in the

given feeds as well as in residues. The dry matter contents of the feeds given and residues left were estimated at weekly intervals. However, for wet residues estimations were carried out immediately using a hot air oven.

Statistical analysis

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 parameters.

Results and Discussion

Body weight and Average Daily Gain (ADG)

Weekly body weights of piglets among the weaning groups were statistically indifferent at birth up to 4th weeks of age, however, piglets of T₁, T₂, and T₃ groups weighted numerically superior compared to T₄ group at the end of 4th week [Table-2]. Consumption of better quality prestarter and starter feed containing dairy products might be the reason of higher body weight of early weaned piglets (T₁, T₂ and T₃) compared to conventional weaning management (T₄), which is in agreement with [4]. Instead of increasing, weekly ADG of piglets from 1st to 4th weeks were gradually decreased in all the weaning groups. Insufficient supply of nutrients from sow milk and creep feed, might be the reason of the reduction in weekly ADG as the sow milk production is insufficient to provide the required nutrition to the young piglets from 2nd weeks of lactation onwards as mentioned by [5]. Due to weaning stress, body weight and weekly ADG for first two weeks post weaning were reduced in all the weaning groups [Table-2]. However, it was less severe in late weaned piglets (T₃ and T₄) compared to early weaned counterparts (T₁ and T₂). Similar post weaning growth lags were also reported by [5] and [6]. After post weaning growth depression for one or two weeks, piglets of all the weaning groups showed positive trends in growth. However, late weaned piglets were not fully recovered from that growth depression and resulted significantly (P<0.05) lower body weights and ADG at the end of 13th weeks of age compared to the early weaned piglets. The present results are comparable with the findings of [6]. From the data, it is clear that, the

advantage of higher growth potentials of young piglets can be exploited by early weaning and there is further room for improvement, both in pre and post weaning growth by better feeding and management.

Average daily feed consumption (ADFC) and Feed conversion efficiency (FCE)

The ADFC of piglets up to four weeks in T₁, T₂ and T₃ were significantly (P<0.05) higher than the piglets in T₄, which might be due to better quality of creep feed containing skim milk powder provided to the piglets of T₁, T₂ and T₃ group [Table-3]. Supply of highly digestible creep feed containing 10-30% dairy products is helpful to stimulate feed intake in young piglets at an early age as mentioned by [4] also support the present results. The higher post weaning feed consumption as compared to low preweaning feed intake in all the weaning groups signified that there might be negative effect of lactation on creep feed consumption of piglets, which is in agreement with [7] and [8]. However, present finding is contrary to the reports of [9], who mentioned that limited nutrient supply to both sows and litters did not drive piglets to consume more creep feed. The overall ADFC per piglet for the whole period of experiment was significantly (P<0.05) higher in early weaned piglets (T₁ and T₂) compared to their late weaned counterparts (T₃ and T₄), which might have contributed for low growth rates in lately weaned piglets. The data revealed that the FCE were in decreasing trend in the first one to two weeks post-weaning, and thereafter it got progressively increased with the advancement of age in all the weaning groups ([Table-3]. It might be because of weaning stress leading to poor growth after weaning. Similar trend of FCE was also noticed by [6] in Large White Yorkshire piglets. It was observed that, the FCE of early weaned (T₁ and T₂) piglets were better than that of lately (T₃ or T₄) weaned ones during different periods (week 7th, 8th, 9th, 10th and 11th) of growth, except during week 12th and 13th. Compensatory post-weaning growth might have improved the FCE of the piglets in T₄ and minimized the difference with early weaned piglets during the said periods. Overall FCE was significantly (p<0.5) better for the early weaned piglets compared to the late weaned ones. The present findings are in confirmation of the results of [6].

Table-1 Composition of different rations used for feeding of experimental pigs

Rations→	Prestarter with SMP & S	Prestarter without SMP & S	Starter with SMP & S	Starter without SMP & S	Grower I	Grower II	Lactation Feed
Age in weeks →	2-3	2-3	4-6	4-6	7-11	12-13	In lactation
Ingredients	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)	Parts (%)
Maize	36.9	43.9	50.9	53.9	57.2	66.4	65.4
SoyBean Meal	10	25	15	20	20	10	10
Ground Nut Cake	5	10	12	10	9	10	10
Wheat Bran	2	5	2	2	2	3	8
Fish meal	8	10	8	8	7	7	4
Skim milk powder	30	0	5	0	0	0	0
Sugar	2	0	1	0	0	0	0
Soybean oil	2	2	2	2	1.8	1	0
Molasses	1	1	1	1	0	0	0
DL_methionine	0.15	0.15	0.15	0.15	0.1	0.1	0
L-Lysine	0.3	0.3	0.3	0.3	0.25	0.25	0.1
Mineral Mixture	2	2	2	2	2	2	2.25
Additives	0.35	0.35	0.35	0.35	0.35	0	0
Salt	0.3	0.3	0.3	0.3	0.3	0.25	0.25
Total	100	100	100	100	100	100	100
Nutrient Contents							
Dry Matter (%)	89.58	86.95	87.47	86.89	86.99	86.79	86.75
Energy(DE)(Kcal/kg)	3330.74	3240.74	3299.74	3291.74	3303.02	3310.02	3228.72
Crude Protein (%)	23.17	23.14	21.07	20.84	20.21	17.54	16.53
Crude Fibre (%)	2.55	4.77	4.04	4.21	4.13	3.86	4.35
Calcium (%)	1.30	1.06	1.03	0.99	0.96	0.91	0.93
Phosphorus (%)	0.92	0.77	0.76	0.73	0.72	0.72	0.75
Ether Extract (%)	4.58	5.89	5.41	5.76	5.50	4.57	3.49
SMP-Skim milk powder, S-Sugar							

Table-2 Body weight (kg) and Average daily gain (g) of T&D pigs under different weaning groups

Age (weeks)	Weaning group			
	28 days(T ₁)	35 days(T ₂)	42 days(T ₃)	56 days(T ₄)
	Body weight (kg)			
At Birth	1.13±0.02	1.12±0.02	1.13±0.02	1.13±0.02
1 st	2.54±0.05	2.52±0.05	2.58±0.03	2.56±0.08
2 nd	3.88±0.07	3.81±0.07	3.87±0.06	3.88±0.12
3 rd	5.04±0.11	5.02±0.10	5.12±0.08	4.99±0.14
4 th	6.14±0.15	6.20±0.14	6.24±0.09	5.92±0.15
5 th	6.68±0.16 ^{ad}	7.15±0.15 ^b	7.27±0.11 ^{bc}	6.60±0.17 ^d
6 th	7.67±0.18 ^{ad}	7.75±0.19 ^{ab}	8.22±0.16 ^{bc}	7.20±0.22 ^d
7 th	9.17±0.21 ^a	8.99±0.23 ^{ab}	8.75±0.20 ^{ac}	8.01±0.27 ^d
8 th	11.04±0.24 ^a	10.81±0.33 ^{ab}	9.68±0.30 ^c	9.04±0.32 ^{cd}
9 th	13.24±0.28 ^a	12.89±0.42 ^{ab}	11.10±0.42 ^c	9.87±0.35 ^d
10 th	15.63±0.33 ^a	15.10±0.53 ^{ab}	13.09±0.47 ^c	11.71±0.40 ^d
11 th	18.29±0.40 ^a	17.78±0.67 ^{ab}	15.31±0.56 ^c	13.84±0.51 ^{cd}
12 th	21.36±0.49 ^a	20.81±0.78 ^{ab}	17.85±0.66 ^c	16.32±0.68 ^{cd}
13 th	24.73±0.58 ^a	24.00±0.87 ^{ab}	20.74±0.75 ^c	19.26±0.78 ^{cd}
-	Average daily gain (g)			
1 st	200.95±4.96	200.00±5.46	207.48±2.97	204.76±9.65
2 nd	191.43±4.81	184.42±7.01	182.14±6.55	188.57±7.44
3 rd	165.40±7.43	172.73±6.82	177.29±5.95	159.05±5.46
4 th	157.46±11.01 ^a	167.86±7.21 ^{ab}	160.44±6.15 ^{ac}	132.06±5.26 ^d
5 th	77.14±8.94 ^a	129.90±8.65 ^b	146.52±7.30 ^{bc}	96.83±7.89 ^{cd}
6 th	141.91±7.60 ^a	85.71±12.83 ^b	136.63±8.56 ^c	86.03±10.76 ^{bd}
7 th	213.97±9.83 ^a	177.41±12.39 ^b	75.09±11.41 ^c	110.07±10.87 ^d
8 th	266.35±10.04 ^a	259.14±19.59 ^{ab}	132.60±18.87 ^c	148.84±11.41 ^{cd}
9 th	314.29±9.73 ^a	297.67±19.29 ^{ab}	203.30±21.77 ^c	118.94±10.26 ^d
10 th	341.91±11.17 ^a	315.95±18.63 ^{ab}	283.88±13.80 ^{bc}	245.58±19.47 ^{cd}
11 th	380.64±11.88 ^a	382.39±21.82 ^{ab}	317.95±17.55 ^c	303.74±22.25 ^{cd}
12 th	438.10±15.84 ^a	433.56±19.81 ^{ab}	362.64±19.44 ^c	354.76±30.88 ^{cd}
13 th	480.95±32.84 ^a	455.15±17.32 ^{ab}	412.82±19.38 ^{bc}	388.15±20.94 ^{cd}
Preweaning	178.81±4.82 ^a	172.23±3.99 ^{ab}	168.86±3.53 ^{ac}	141.28±5.48 ^d
Post weaning	295.98±8.01 ^a	300.87±12.51 ^{ab}	255.47±13.12 ^{cd}	287.19±14.37 ^{ad}
Birth to 13 th week	259.27±6.20 ^a	251.39±9.43 ^{ab}	215.50±8.13 ^{cd}	199.17±8.55 ^d

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

Table-3 Average daily feed intake (ADFI) and feed conversion efficiency (FCE) of T&D pigs under different weaning groups

Age	Weaning group			
	28 days (T ₁)	35 days (T ₂)	42 days (T ₃)	56 days (T ₄)
	Average daily feed intake (gram)			
1 st -4 th weeks	18.45±2.561 ^a	17.78±1.360 ^{ab}	17.08±2.388 ^{ac}	8.77±0.881 ^d
1 st -5 th weeks	63.22±3.802 ^a	32.60±1.951 ^b	27.08±3.618 ^{bc}	18.13±2.529 ^{cd}
1 st -6 th weeks	117.14±3.822 ^a	78.92±2.173 ^b	39.28±4.561 ^c	32.55±3.470 ^{cd}
1 st -8 th weeks	215.91±7.242 ^a	200.56±6.373 ^{ab}	134.63±2.55 ^c	75.61±9.248 ^d
9 th -13 th weeks	986.91±34.092 ^a	1003.61±21.527 ^{ab}	914.02±52.368 ^{ac}	832.08±12.243 ^{cd}
Pre weaning	18.45±2.561 ^a	32.60±1.951 ^b	39.28±4.561 ^c	75.61±5.909 ^d
Post weaning	732.01±23.804 ^a	807.44±16.844 ^a	773.07±21.266 ^{ab}	812.08±12.503 ^b
1 st -13 th weeks	512.45±16.757 ^a	509.43±9.275 ^{ab}	434.40±21.234 ^c	358.870±24.649 ^d
-	Feed conversion efficiency (FCE)			
5 th week	4.31 ± 1.56	-	-	-
6 th week	2.93 ± 0.34	3.70± 0.59	-	-
7 th week	2.21±0.10 ^a	3.08±0.35 ^{ab}	5.78±1.14 ^c	-
8 th week	2.12±0.12 ^a	2.69±0.32 ^{ab}	4.26±0.68 ^c	-
9 th week	2.26±0.15 ^a	2.52±0.16 ^{ab}	3.09±0.37 ^{bc}	4.08±0.27 ^d
10 th week	2.48±0.13 ^a	2.66±0.11 ^{ab}	2.77±0.16 ^{ac}	3.10±0.15 ^{cd}
11 th week	2.57±0.07 ^a	2.69±0.07 ^{ab}	2.90±0.08 ^{ac}	3.21±0.19 ^{cd}
12 th week	2.60±0.05	2.70±0.04	2.93±0.07	2.92±0.21
13 th week	2.64±0.07	2.90±0.06	2.91±0.05	2.71±0.29
Postweaning	2.45±0.08 ^a	2.74±0.08 ^{ab}	3.05±0.07 ^{bc}	3.00±0.15 ^{bd}

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

Conclusion

From the present study, it may be concluded that weaning management at 28 or 35 days of age with quality pre-starter and starter ration for piglets might be advantageous as compared to weaning management at 42 or 56 days of age.

However further study in these aspects will widen the knowledge base and may helpful in developing an early weaning management protocol suitable to Indian condition.

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-22, Assam for providing the facilities to carry out the research work.

Conflict of Interest: None declared

References

- [1] Harrell R.J., Thomas M.J., and Boyd R.D. (1993) Limitations of sows milk yield on baby pig growth. *Cornell Nutrition Conference for Feed Manufacturers*. pp.156-164. Cornell University, Ithaca, NY.
- [2] Whittemore C.T. (1998) The science and practice of pig production (2nd edition), Blackwell Science Ltd, Oxford, UK.
- [3] National Research Council (1998) National Research Council, Nutrient Requirements of Swine, tenth revised edition, National Academy Press, 2101 Constitution Avenue, NW, Washington, DC.20418.
- [4] Mavromichalis I. (2006) Feed Intake and Management. *Applied nutrition for young pigs*. pp. 57-90. CABI, Wallingford, Oxfordshire OX10 8DE, United Kingdom.
- [5] Devi A.A. and Singh S.K. (1998) *Indian Journal of Animal Sciences*, 68(9), 976-977.
- [6] Phukon J.C. (2011) Influence of early weaning on productive performance in Large White Yorkshire pigs. *M.V.Sc. thesis*, submitted to Tamil Nadu University of Veterinary and Animal Sciences (TANUVAS), Tamil Nadu, India.
- [7] Kuller W.I., Soede N.M., Van Beers-Schreurs H.M.G. and Langendijk P. (2007) *J AnimSci*, 85, 1295-1301.
- [8] Schinckel A.P., Cabrera P.A.S.R., Boyd R.D., Jungst S., Booher C., Johnston M. and Einstein M.E. (2007) *The Professional Animal Scientist*, 23, 197-210.
- [9] Sulabo R.C., Jacela J.Y., Tokach M.D., Dritz S.S., Goodband R.D., De Rouche J.M. and Nelssen J.L. (2010) *J AnimSci*, 88, 3145-3153.