

Effect of Weaning Management on Carcass Characteristics of T&D Pigs

G. Kalita¹, R. Rouchoudhury², D. Kalita³, B. N. Saikia⁴, J. Saharia⁵, M. Bora⁶, M. K. Nath⁷, D. J. Talukdar⁸

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

^{2,5,6}Department of Livestock Production Management, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahat-22, Assam, India

^{3,7,8}AICRP on Pig, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahat, Assam, India

⁴Department of Animal Nutrition, College of Veterinary Sciences, Assam Agricultural University, Khanapara, Guwahat, Assam, India

ABSTRACT

The present study was carried out on 24 growing finishing T & D (Tamworth x Desi) pigs maintained at All India Coordinated Research Project on Pig (Mega Seed Project), College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, Assam, which were weaned at 28, 35, 42 and 56 days. After the end of growing finishing period (14 to 34 weeks) all the pigs were slaughter to study some of the important quantitative and qualitative carcass traits. Pigs under 28 days weaning group weigh significantly ($P<0.05$) higher carcass weight compared to 35, 42 or 56 days weaning group. Whereas no differences were observed in dressing percentage (%), head weight, weight of alimentary tract with contents including urinary bladder, genitalia, spleen, kidney and pancreas and weight of shank among the carcasses of pigs under different weaning groups. Apart from loin and bacon, no differences were observed in ham, picnic, butt and jowl weight in the carcasses of pigs weaned at different ages in the present study. It was observed that there were only numerical superiority of carcass length and loin eye area, but significantly ($P<0.05$) higher back fat thickness in early weaned pigs compared to lately weaned pigs.

Keywords: weaning, T&D pigs, quantitative and qualitative carcass traits, whole sale cuts, carcass length, backfat thickness, loin eye area

I. INTRODUCTION

Improvement in resource use efficiency is one of the important key components of sustainable 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 proceeds (Harrell et al. 1993). 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.

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 (13th weeks of age) and superiority of growth rate of early weaned piglets continued till the end of slaughter age (34 weeks). Information about the carcass characteristics of T&D pigs is very scanty. Therefore the present work was undertaken to study the some of the important carcass characteristics of T&D pigs and also to evaluate the effect of weaning management on some carcass parameters.

II. METHODS AND MATERIAL

The experiment was carried out on 24 weaned growing finishing pigs born to 20 T&D (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-781022, Assam. Six castrated grower pigs of average body weight 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 (T₁) of age. Similarly 18 other castrated grower pigs (six per weaning group) were selected from the litters 15 sows (5 sows in each weaning group) which were weaned at 35 (T₂), 42 (T₃) and 56 days (T₄) of age. Pigs so selected were reared individually and reared 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 by NRC (1998).

At the end of 34 weeks of age, all the 24 pigs were slaughtered, dressed, eviscerated and splitted into two

symmetrical halves as per the methods described by Ziegler (1968) to carry out the present investigation. The heads were decapitated at the *atlanto-occipital* joints, fore shanks were removed at the knee joints and hind shanks were disjointed at the hock joints. The weights of hot halved carcasses were recorded to find out the dressing percentage. The visceral organs on removal were washed and cleaned thoroughly and were weighted. Some of the important quantitative carcass characteristics like carcass weight, dressing percentage, weight of various wholesale cuts (Ham, loin, bacon, picnic, butt and jowl) and some qualitative carcass characteristics like carcass length, back-fat thickness and loin eye area were recorded.

Statistical analysis of data was done as per Snedecor and Cochran (1994).

The research was approved by IAEC through the no 770/ac/CPCSEA/F.V.Sc./AAU/IAEC/123.

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

Sl. No.	Rations→	Grower II	Finisher I	Finisher II
	Age in weeks rations were fed→	14-17	18-27	28-34
B.	Cost of ration per kg (₹)	18.51	15.89	15.03
C	Nutrient Contents (<i>calculated</i>)			
	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

III. RESULT AND DISCUSSION

Quantitative carcass characteristics

The average slaughter weights, hot carcass weights, dressing percentage, head weights, weights of alimentary tract with contents (including urinary bladder, genitalia, spleen, kidney and pancreas), pluck weights and weights of shank of T&D pigs of different weaning groups are presented in **Table 2**.

Slaughter weight

The mean slaughter weight was highest in early weaned pigs (103.00±2.93 kg in 28 days weaning group-T₁), intermediate in 35 (97.08±2.34 kg in T₂) and 42 days (93.25±2.67 kg in T₃) and lowest in 56 days weaning group (89.67±3.49 kg in T₄). The differences in slaughter weights among the different weaning groups were because of the variations in body weights at the beginning of the growing period (week 14), which persisted till slaughter age (week 34). Similar effects were also reported by Mahan (1993), Wolter *et al.* (2002), Whitney *et al.* (2006) and Oliveira *et al.* (2011). Slaughter weights of the present study is comparable to the findings of Patel *et al.* (2009) in Large White Yorkshire (75.33±5.21 kg at 7 months) and Murugan *et al.* (2009) in Duroc x Large White Yorkshire x Landrace (106.40 to 119.90 kg at 10 months). Anon (2011) reported the slaughter weight of 70-80 kg for T&D Pigs.

Carcass weight

The average hot carcass weights (kg) in T₁, T₂, T₃ and T₄ were 76.58±2.10, 72.00±1.58, 69.25±2.22 and 65.92±2.70 respectively. As expected, average hot carcass weight in T₁ was significantly (P<0.05) higher than T₃ and T₄, whereas no differences were observed between T₁ and T₂ and among T₂, T₃ and T₄ groups. Carcass weight is mainly related to slaughter weight, the variations in slaughter weights might resulted in differences in carcass weight among the different weaning groups.

Dressing percentage

The average dressing percentage (%) in T₁, T₂, T₃ and T₄ were recorded to be 74.37±0.28, 74.19±0.30, 74.23±0.47 and 73.49±0.30 respectively. Anon (2011) reported the dressing percentage of T&D Pigs as 75.05, which is agreement with the present findings. Apart from numerical superiority of early weaned pigs (T₁) over lately weaned pigs (T₄), there were non-significant (P<0.05) differences in dressing percentage among the different weaning groups. Numerically higher dressing percentage recorded in pigs of T₁ group, might be because of higher body weights at slaughter over the pigs of T₄ group. Whittemore (1998) mentioned that for each kg increase in slaughter weight between 80 and 120 kg live weight, the dressing percentage increased by 0.1% units. In the present findings, the difference in live weights at slaughter between the pigs of T₁ (103.00 kg)

and T₄ (89.67 kg) groups was 13.33 kg and the difference in dressing percentage (%) between T₁ (74.37) and T₄ (73.49) groups was 0.88 %, which nearly satisfied the statement given by Whittemore (1998).

Head weight

The average head weight (kg) of T&D pigs was highest for the pigs in T₁ (4.33±0.21), followed by T₂ (4.12±0.10), T₃ (4.00±0.05) and T₄ (3.88±0.08). The variations in head weights were due to differences in slaughter weights of animals under different weaning groups, however statistical analysis revealed non-significant (P<0.05) differences among them. Weight of head in percent to slaughter weight ranged from 4.20±0.15 (T₁) to 4.35±0.09 (T₄). The findings of the present study were similar with the reports of Sharma (1994) and Mili (1995), whereas Sangma (1992) and Sailo (2005) mentioned higher values for head weight. The variations might be due to the difference in breed, age and weight at slaughter, conformations of animals etc.

Weight of alimentary tract with contents including urinary bladder, genitalia, spleen, kidney and pancreas (ATWC)

The average weights (kg) of alimentary tract with contents including urinary bladder, genitalia, spleen, kidney and pancreas were 11.63±0.32, 11.07±0.17, 10.90±0.26 and 10.67±0.36 and this comprised 11.30 ± 0.18, 11.42 ± 0.18, 11.71 ± 0.24 and 11.92 ± 0.22 per cent of the slaughter weight in T₁, T₂, T₃ and T₄ respectively. Statistical analysis revealed non-significant (P<0.05) difference in weights of alimentary tract with contents (including urinary bladder, genitalia, spleen, kidney and pancreas) among the different weaning groups. The data revealed that decrease in slaughter weight resulted in slight decrease in weight of ATWC, but there was slight increase in percent weight of ATWC to slaughter weight. This might be because of the fact that carcass grows relatively faster than the gut and the gut therefore comprises a progressively lesser proportion of the whole animal as it increases in size (Whittemore 1998). Higher ATWC weights could be linked to higher feed intake capacity and better ADG of pigs weaned at early age (T₁ and T₂) than the late weaned ones (T₃ and T₄). Sangma (1992) and Mili (1995) also reported

similar records in their experiment in Hampshire and crossbred pigs. For comparison among various weaning groups, no such reports are available.

Pluck weight (Trachea, lungs, heart, liver)

The pluck weights (kg) averaged 2.98±0.05, 2.92±0.08, 2.77±0.05 and 2.73±0.07 kg in T₁, T₂, T₃ and T₄ respectively. In respect to per cent slaughter weight, it constituted 2.90±0.06, 3.01±0.07, 2.97±0.06 and 3.06±0.05 in T₁, T₂, T₃ and T₄ respectively. Data revealed that pluck weights were higher (P<0.05) in early weaned pigs (T₁ and T₂) compared to the lately weaned pigs (T₃ and T₄). Higher slaughter weights of early weaned pigs might be related to this significant (P<0.05) difference. Sangma (1992) and Mili (1995) also reported higher pluck weights when slaughter weights were higher. Present findings of pluck weight for different slaughter weights under different weaning groups were in agreement with the report of Wiseman *et al.* (2007).

Shank weight

The average shank weights (kg) were found to be 1.92±0.07, 1.90±0.05, 1.85±0.04 and 1.80±0.06 and it constituted 1.86±0.05, 1.96±0.04, 1.99±0.04 and 2.01±0.04 per cent of the slaughter weights in T₁, T₂, T₃ and T₄ respectively. Statistically, non-significant (P<0.05) differences were observed in shank weights among the different weaning groups. There was only numerical superiority in shank weights of pigs weaned at early age (T₁ and T₂) compared to lately weaned (T₃ and T₄) pigs, which might again be related to higher slaughter weights of early weaned pigs. Shank weights only constitute 1.86 to 2.01 percent (1.86% in T₁ and 2.01% in T₄) of the slaughter weight and that might be not be enough to make a difference when there was a variation of only 13.33 kg between the highest and lowest slaughter weights (T₁ and T₄) of pigs under study. Sharma (1994) and Sailo (2005) recorded similar shank weights, whereas Sangma (1992) reported little higher shank weight as compared to the slaughter weight in her study. These differences again might be related to differences in breed, age and weight at slaughter, body conformation etc.

Wholesale cuts

The average weights of different wholesale cuts namely Ham, Loin, Bacon, Picnic, Butt and Jowl of different weaning groups are presented in Table 4.14(A) and the respective analysis of variance in Table 4.14(B).

a) Ham : The weights of Ham in T₁, T₂, T₃ and T₄ were 25.75±0.38, 25.71±0.43, 25.80±0.48 and 26.61±0.18 per cent of the carcass weights and its average weights (kg) were 19.76± 0.52, 18.50 ± 0.27, 17.70 ± 0.66 and 17.64 ± 0.64 respectively. Statistically, non-significant (P<0.05) differences were observed in ham weights among the different weaning groups. The data revealed that increase in body weights resulted gradual increased in ham weights, whereas, ham weights per cent to carcass weights decreased with increase in slaughter weights. Statistical analysis revealed non-significant (P<0.05) difference in per cent ham weights among the carcasses of different weaning groups. Per cent ham weight in the present study was similar with the reports of Massar (1989) and Patel *et al.* (2009), whereas higher values were reported by Das and Mishra (1986) and Singh *et al.* (1997). However, Pavlic *et al.* (1980) and Anon (1991) reported lower per cent ham weight than the present findings.

b) Loin: Loin weights comprised of 19.87±0.33, 21.00±0.49, 20.96±0.60 and 22.24±0.52 per cent of slaughter weights in T₁, T₂, T₃ and T₄ respectively and the percent loin weight for T₄ was significantly (P<0.05) higher as compared to T₁. The average weights (kg) of loin were recorded as 15.20 ± 0.36, 14.94 ± 0.71, 14.40 ± 0.42 and 14.66 ± 0.73 in T₁, T₂, T₃ and T₄ respectively. It was observed that loin weight in per cent to slaughter weight was highest in carcasses of lately weaned pigs (T₄) and lowest in carcasses of early weaned pigs (T₁) group and intermediate in carcasses of pigs weaned at 35 days (T₂) or 42 days (T₃) of age. Increased fat deposition in higher slaughter weight pigs (T₁) might resulted in lower per cent loin weights as compared to the lower slaughter weight pigs (T₄). Per cent loin weight in the present study were in agreement with the reports of Massar (1989), Anon (1991a) and Sangma (1992), whereas Anon (1991) and Patel *et al.*(2009) reported higher in per cent loin weights than the present findings.

c) Bacon: Weights (kg) of bacon averaged 25.85±0.14, 24.55±0.53, 24.28±0.45 and 22.66±0.43 per cent of slaughter weights in T₁, T₂, T₃ and T₄ and the average weights (kg) were 19.90 ± 0.50, 17.84 ± 1.25, 16.53 ± 0.71 and 15.20 ± 0.60 respectively. Statistical analysis revealed that the weight of bacon was significantly (P<0.05) higher in T₁ compared to the other weaning groups. Per cent bacon weights were significantly higher for the carcasses of early weaned (T₁ and T₂) pigs as compared to lately weaned (T₃ and T₄) ones. Carcass weights of early weaned pigs were significantly higher in early weaned pigs, wherein percent weights of the lean cuts like loin and ham were comparatively lower and that might resulted in higher weights of bacon which contain more fat. On the other hand, the carcasses of lately weaned animals, where lean cuts were proportionately higher resulted in proportionate reduction in bacon weight. From the present findings it could be inferred that after attaining certain body weights, fat deposition increases as compared to protein deposition. Per cent bacon weights in the present findings were much higher than the reports of Anon (1991) and Sangma (1992), whereas higher values were reported by Massar (1989).

d) Picnic: The weights of picnic in T₁, T₂, T₃ and T₄ groups were 13.55±0.13, 13.57±0.22, 13.82±0.27 and 13.59±0.30 per cent of the carcass weights and the average picnic weights (kg) were 10.50±0.29, 9.82±0.25, 9.33±0.32 and 9.06 ± 0.39 respectively. Statistically, non-significant (P<0.05) differences were observed in picnic weights among the different weaning groups, though the weights of the picnic were increased along with the increase in carcass weights of early weaned pigs (T₁ and T₂). Das and Mishra (1986) and Sangma (1992) reported similar per cent weights of picnic with the present findings.

e) Butt: Butt weights comprised of 11.65±0.29, 11.94±0.29, 11.91±0.34 and 11.68±0.29 per cent of slaughter weights in T₁, T₂, T₃ and T₄ respectively. The average butt weights (kg) in T₁, T₂, T₃ and T₄ were recorded as 9.14±0.42, 8.76±0.31, 7.88±0.47 and 7.78±0.43 respectively. Non-significant (P<0.05) differences were observed for percent butt weights among the different weaning groups. However, the weights of butt were increased along with the increase in carcass weights of early weaned pigs (T₁ and T₂). Das

and Mishra (1986) and Sangma (1992) also reported similar per cent weights of butt with the present findings.

f) Jowl: Weights of jowl averaged 3.33 ± 0.10 , 3.24 ± 0.15 , 3.22 ± 0.144 and 3.21 ± 0.14 per cent of slaughter weights in T₁, T₂, T₃ and T₄ and the average jowl weights (kg) were 2.60 ± 0.13 , 2.36 ± 0.15 , 2.18 ± 0.14 and 2.16 ± 0.17 kg respectively. Non-significant ($P<0.05$) differences were observed in the weights of jowl among the different weaning groups. However jowl contributed numerically higher per cent weight for the carcasses of early weaned pigs which also indicated the higher growth of fatty tissues in the carcasses of early weaned pigs compared to lately weaned ones. Das and Mishra (1986) and Sangma (1992) reported similar per cent weights of jowl with the present findings.

Qualitative carcass characteristics

The measurements of economically important qualitative carcass traits of T&D pigs namely carcass length, back-fat thickness and loin eye area of different weaning groups are presented in **Table 2**.

Carcass length

The average values of the carcass length (cm) in T₁, T₂, T₃ and T₄ were found to be 73.00 ± 0.97 , 72.83 ± 1.62 , 72.33 ± 0.76 and 69.33 ± 0.76 respectively. Carcass lengths were not significantly ($P<0.05$) different among the weaning groups under study, however there were numerical superiority for the carcasses of early weaned pigs. Higher growth rates of early weaned pigs might lead to higher carcass weight and skeleton size and might cause increase in carcass length of early weaned pigs. Mili (1995) also reported higher carcass length for the Hampshire pigs slaughtered with higher body weights than the lower weight ones. Singh *et al.* (1997) reported relatively higher records of carcass length for T&D pigs compared to present findings, when carcass weight was 112.19 ± 2.16 kg, which might be because higher age and body weight of animals than the present one. Anon (2011) reported the carcass length (cm) of T&D Pigs as 68.55 for the pigs weighing 70-80 kg at the time of slaughter.

Back fat thickness

Back-fat thicknesses (cm) were 3.63 ± 0.10 , 3.58 ± 0.16 , 3.26 ± 0.09 and 3.04 ± 0.23 in T₁, T₂, T₃ and T₄ respectively. Back fat thickness in the carcasses of early weaned pigs were significantly ($P<0.05$) higher compared to the lately weaned pigs. Relatively bigger size of alimentary tract might be the cause of higher feed consumption leading to better growth and more fat deposition in the early weaned pigs than the lately weaned pigs. Mili (1995) and Kumar *et al.* (2005) also reported similar trend of increase in back fat thickness along with increase in body weights in Hampshire and Large White Yorkshire pigs respectively. Singh *et al.* (1997) reported relatively lower records of back fat thickness in carcasses of T&D pigs than the present findings, which might be because of different plane of nutrition adopted.

Loin eye area

The loin eye area (cm²) values averaged 29.46 ± 0.89 , 29.19 ± 1.01 , 28.92 ± 0.76 and 28.29 ± 0.43 in T₁, T₂, T₃ and T₄ groups respectively. The mean loin eye area didn't differ much among the different weaning groups, however like carcass length and back fat thickness, there were numerical superiority of loin eye area in carcasses of early weaned pigs. This might be attributed to higher slaughter weight and carcass weights of pigs under early weaning groups. The loin eye area recorded in present study compared well with the reports of Ravi *et al.* (2005) and Patel *et al.* (2009) in Large White Yorkshire, Sangma (1992) and Mili (1995) for Hampshire pigs. Singh *et al.* (1997) recorded somewhat lower loin eye area compared to the present findings in T&D pigs when slaughter weight was 112.19 ± 2.16 kg.

Effect of weaning management on carcass characteristics

In the present study, significantly higher slaughter weight at 34 weeks of age resulted in significantly ($P<0.05$) higher carcass weight in 28 days weaned pigs compared to 35, 42 or 56 days weaning pigs. Whereas no differences were observed in dressing percentage (%), head weight, weight of alimentary tract with contents including urinary bladder, genitalia, spleen, kidney and pancreas and weight of shank among the carcasses of pigs under different weaning groups.

Morrison *et al.* (2008) did not observe differences in dressing percentage in pigs slaughter at 152 days of age under 22 days or 29 days weaning age. Dritz *et al.* (1996) also observed no difference in dressing percentage of pigs weaned at 9 or 19 days and slaughtered at 109 kg weight. Higher slaughter weights of early weaned pigs (T₁ and T₂) might be the cause of higher pluck weights (P<0.05) compared to the lately weaned pigs (T₃ and T₄). Sangma (1992) and Mili (1995) recorded higher pluck weight when slaughter weights were higher.

Apart from loin and bacon, no differences were observed in ham, picnic, butt and jowl weight in the carcasses of pigs weaned at different ages in the present study. Increased fat deposition in higher slaughter weight pigs (T₁) might resulted in lower per cent loin weights and higher per cent bacon weight as compared to the lower slaughter weight pigs (T₄). No such reports are available to make comparison of different wholesale cuts under different weaning age.

In the results of the present study it was observed that there were only numerical superiority of carcass length and loin eye area, but significantly (P<0.05) higher back fat thickness in early weaned pigs compared to lately

weaned pigs. Higher slaughter weights in early weaned pigs might be the cause of little higher carcass length and back fat thickness in carcasses of early weaned pigs. Wide variability within the group might have resulted in non-significant difference of carcass length and loin eye area among the different weaning groups. Dritz *et al.* (1996) also observed higher back fat thickness in early weaned pigs compared to lately weaned pigs. Anon (2007) also recorded significantly higher level of back fat thickness in pigs weaned at 4 weeks of age when compared to pigs weaned at 6 or 8 weeks of age. Morrison *et al.* (2008) mentioned that piglets weaned at 22 days weigh more at 152 days of age, yield more carcass weight and measured more back fat thickness than 29 days weaning group. Cabrera (2010) observed that piglets weaned at 20 days had more loin depth with more lean percentage than carcasses of 2 or 14 days weaned pigs. Hohenshell *et al.* (2000) on the other hand didn't find any difference in back fat thickness for pigs weaned at 10 d of age compared to 30 d of age. Collins *et al.* (2010) also didn't find major influence on lifetime growth performance or body composition at commercial slaughter weights when weaning age was 13 or 21 days.

Table 2. Mean (\pm SE) of certain Quantitative and Qualitative carcass traits of T&D pigs under different weaning groups

Traits	Weaning Group			
	28 days (T ₁)	35 days (T ₂)	42 days (T ₃)	56 days (T ₄)
A. Quantitative carcass traits				
i. Slaughter weight (kg)	103.00 \pm 2.93 ^a	97.08 \pm 2.34 ^{ab}	93.25 \pm 2.67 ^{ac}	89.67 \pm 3.49 ^{bcd}
ii. Hot carcass weight (kg)	76.58 \pm 2.10 ^a	72.00 \pm 1.58 ^{ab}	69.25 \pm 2.22 ^{bc}	65.92 \pm 2.70 ^{bd}
iii. Dressing percentage (%)	74.37 \pm 0.28	74.19 \pm 0.30	74.23 \pm 0.47	73.49 \pm 0.30
iv. Head weight (kg)	4.33 \pm 0.21 (4.20 \pm 0.15)	4.12 \pm 0.10 (4.24 \pm 0.03)	4.00 \pm 0.05 (4.30 \pm 0.10)	3.88 \pm 0.08 (4.35 \pm 0.09)
v. Weight of alimentary tract with contents including urinary bladder, genitalia, spleen, kidney and pancreas (kg)	11.63 \pm 0.32 (11.30 \pm 0.18)	11.07 \pm 0.17 (11.42 \pm 0.18)	10.90 \pm 0.26 (11.71 \pm 0.24)	10.67 \pm 0.36 (11.92 \pm 0.22)
vi. Pluck weight (kg)	2.98 \pm 0.05 ^a (2.90 \pm 0.06)	2.92 \pm 0.08 ^{ab} (3.01 \pm 0.07)	2.77 \pm 0.05 ^{bc} (2.97 \pm 0.06)	2.73 \pm 0.07 ^{cd} (3.06 \pm 0.05)
vii. Shank weight (kg)	1.92 \pm 0.07 (1.86 \pm 0.05)	1.90 \pm 0.05 (1.96 \pm 0.04)	1.85 \pm 0.04 (1.99 \pm 0.04)	1.80 \pm 0.06 (2.01 \pm 0.04)
Above figures within parentheses indicate percent to slaughter weight				

Traits	Weaning Group			
	28 days (T ₁)	35 days (T ₂)	42 days (T ₃)	56 days (T ₄)
viii. Wholesale cuts				
a) Ham (%)	25.75±0.38 (19.76± 0.52)	25.71±0.43 (18.50 ± 0.27)	25.80±0.48 (17.70 ± 0.66)	26.61±0.18 (17.64 ± 0.64)
b) Loin (%)	19.87±0.33 ^a (15.20 ± 0.36)	21.00±0.49 ^{ab} (14.94 ± 0.71)	20.96±0.60 ^{ac} (14.40 ± 0.42)	22.24±0.52 ^{bd} (14.66 ± 0.73)
c) Bacon (%)	25.85±0.14 ^a (19.90 ± 0.50)	24.55±0.53 ^b (17.84 ± 1.25)	24.28±0.45 ^{bc} (16.53 ± 0.71)	22.66±0.43 ^d (15.20 ± 0.60)
d) Picnic (%)	13.55±0.13 (10.50 ± 0.29)	13.57 ±0.22 (9.82 ± 0.25)	13.82±0.27 (9.33 ± 0.32)	13.59±0.30 (9.06 ± 0.39)
e) Butt (%)	11.65±0.29 (9.14 ± 0.42)	11.94 ±0.29 (8.76 ± 0.31)	11.91±0.34 (7.88 ± 0.47)	11.68±0.29 (7.78 ± 0.43)
f) Jowl (%)	3.33±0.10 (2.60 ± 0.13)	3.24 ±0.15 (2.36 ± 0.15)	3.22±0.14 (2.18 ± 0.14)	3.21±0.14 (2.16 ± 0.17)
Above figures (for Sl. No. viii. Wholesale cuts) within parentheses mean (± SE) weight in kilogram (kg).				
B. Qualitative carcass traits				
i. Carcass length (cm)	73.00±0.97	72.83±1.62	72.33±0.76	69.33±0.76
ii. Back fat thickness (cm)	3.63±0.10 ^a	3.58±0.16 ^{ab}	3.26±0.09 ^{ac}	3.04±0.23 ^{cd}
iii. Loin eye area (cm ²)	29.46±0.89	29.19±1.01	28.92±0.76	28.29±0.43

IV. CONCLUSION

Based on the available reports, present results of carcass characters under different weaning groups were well justified. However, due to scanty information, more study is required to evaluate the relationship of carcass characteristics with weaning age especially weaning age ranged from 28 to 56 days.

V. 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 this work.

VI. REFERENCES

- [1]. Anon (1991). All India Co-ordinated Research project on Pigs. Assam Agricultural University, Khanapara, Annual Report 1990-91.
- [2]. Anon (2007). Final Report: IS0212-Sustainable systems for pig weaner management. (AGEWEAN), downloaded from [www: http://randd.defra.gov.uk](http://randd.defra.gov.uk) on 11-03-2012.
- [3]. 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, pp 25-34.
- [4]. Cabrera, R.A., Boyd, R.D., Jungst, S.B., Wilson, E.R., Johnston, M.E., Vignes, J.L. and Odle, J. (2010). Impact of lactation length and piglet weaning weight on long-term growth and viability of progeny. *J Anim Sci*, **88**: 2265-2276.
- [5]. Collins, C.L., Leury, B.J. and Dunshea, F.R. (2010). Early weaning has minimal effects on lifetime growth performance and body composition of pigs. *Anim. Prod.*, **50**: 79-87.
- [6]. Dash, P. and Mishra, M. (1986). Performance of Large White Yorkshire and its crossbreds with indigenous pigs in Orissa. *Indian Journal of Animal Sciences*, **56**(1): 144-146.
- [7]. Dritz, S.S., Owen, K.Q., Nelssen, J.L., Goodand, R.D. and Tokach, M.D. (1996). Influence of weaning age and nursery diet complexity on growth performance and carcass characteristics and composition of high-health status pigs from weaning to 109 kilograms. *J Anim Sci*, **74**: 2975-2984.
- [8]. 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.*, pp 156-164. Cornell University, Ithaca, NY.

- [9]. Hohenshell, L.M., Cunnick, J.E., Ford, S.P., Kattesh, H.G., Zimmerman, D.R., Wilson, R.L., Wilson Matteri, J.A. and Lay Jr., D.C. (2000). Few differences found between early- and late-weaned pigs raised in the same environment. *J Anim Sci*, **78**: 38-49.
- [10]. Kumar, K.G., Siva Kumar, T., Sampath, K. and Ranjith, T. (2005). Carcass traits of crossbred pigs. *Indian Vet.J.*, **82**(11): 1189-1192.
- [11]. 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.
- [12]. Massar, R. (1989). Studies on the effect of Complete and Baibutrcjan's method of castration on the body weight gain and some quantitative and qualitative parameters of meat of Hampshire pigs. M.V.Sc. thesis, College of Veterinary Science, AAU, Khanapara, Guwahati-22.
- [13]. Mili, D.C. (1995). Effect of age at slaughter on the growth rate and weight at slaughter on carcass yield and certain meat quality characteristics of Hampshire pigs. Ph.D. thesis, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22, Assam.
- [14]. Morrison, R., Pluske, J., Smits, R., Henman, D., Collins, C. (2008). Creep feeding - weaning age interactions with creep feeding. Report prepared for the co-operative research centre for an Internationally Competitive Pork Industry, Pork CRC, Australia.
- [15]. 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.
- [16]. 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.
- [17]. 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.
- [18]. Patel, M., Sharma, R.J., Kumar, A., Tiwari, D.P., Prabakaran, P. and Anindita, P. (2009). Effect on carcass characteristics of pigs fed with different level of jiggery filter cake along with concentrate. *Indian Journal of Animal Sciences*, **79** (10): 1054-1057.
- [19]. Pavlic, J., Siler, R., Pulkrabek, J. and Safranek, F. (1980). Growth and meat production of sire breeds of pigs used in hybridisation. *Zivocisna Vyroba*, **25** (4): 279-291. (*cf. Anim. Breed. Abstr.* 49: 2724).
- [20]. Ravi, A., Rao, S.D. and Yedukondalu, R. (2005). Growth response and carcass characteristics of crossbred finisher pigs fed rations containing green gram chuni. *Indian Vet. J.*, **82**(1): 48-51.
- [21]. Sailo, N. (2005). Effect of body cooling and energy levels on the growth performance and carcass characteristics of pigs. M.V.Sc. thesis, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22, Assam.
- [22]. Sangma, B.D. (1992). Certain quantitative and qualitative meat characteristics of Hampshire, Hampshire x Local and Local pigs in Assam. M.V.Sc. thesis, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22, Assam.
- [23]. Sharma, P.K. (1994). Effect of stocking density on growth, feed conversion efficiency and carcass characteristics of Hampshire pigs under the climatic condition of Assam. Ph.D. thesis, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-22, Assam.
- [24]. Singh, S.K., Jha, D.D., Nath, S., Singh, R.L. and Pandey, R.N. (1997). Factors affecting carcass characteristics in exotic, desi and crossbred pigs. *Indian Journal of Animal Sciences*, **67**(12): 1094-1097.
- [25]. Snedecor, G.W. and Cochran, W.G. (1994). Statistical methods. 8th edn. Iowa State University Press, USA.
- [26]. 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.
- [27]. Whittemore CT (1998) The science and Practice of Pig Production, Reproduction. 2nd edn, pp.91-130. Blackwell Science Ltd, Oxford UK.
- [28]. Wiseman, T.G., Mahan, D.C., Peters, J.C., Fastinger, N.D., Ching, S. and Kim, Y.Y. (2007). Tissue weights and body composition of two genetic lines of barrows and gilts from twenty to one hundred twenty-five kilograms of body weight. *J Anim Sci*, **85**: 1825-1835.
- [29]. 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.
- [30]. Ziegler, P.T. (1968). The meat we eat. The interstate printers and publishers, Inc. Danville, Illinois, USA.