RESEARCH ARTICLE

A Study of Body Weight and Its Relation with Linear Body Measurements in Piglets Fed Different Feed Formulation

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Abstract

The present experiment was carried out to study the body weight and its relation with the linear body measurements of pre-weaned piglets fed with different feed formulation viz., T_0 (fed conventional creep feed), T_1 (fed 5% milk powder supplemented creep feed), T_2 (fed probiotics supplemented creep feed) and T_3 (fed creep feed supplemented with 5% milk powder and probiotics). The final body weights at 8th weeks of age were highest in T_3 (12.395 ± 0.051 kg) followed by T_2 (11.230 ± 0.094), T_1 (9.940 ± 0.103) and T_0 (8.781 ± 0.073). These findings indicated a positive effect of added supplement in the body weight of pre-weaned piglets. The results showed that the linear body measurements of the piglets maintained a positive correlation with body weight and increased steadily with a significant effect (p <0.001) of treatment on all three traits. piglets, probiotics.

Keywords: Body weight, Body weight gain, Linear body measurements, Milk powder, Pre-weaned.

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Introduction

Animal husbandry is an indispensable component of agriculture. Since ages animal rearing was carried out side by side with crop cultivation as a basic activity. In the present scenario, there has been a major change in the food consumption scenario with the growing human population adding a burden to produce more food grains and as such meat and meat products consumption is also increasing. Among various livestock species, the pig is a promising species with its higher fecundity, better feed conversion efficiency, early maturity, shorter generation interval and relatively smaller space requirements in housing makes pig rearing as one of the major sources of meat production also making it a lucrative and profitable livestock business in India. As per the 19th Livestock Census–2012, the total pigs in the country is 10.29 million, contributing around 2.01% of the total livestock population (512.05 million). The domestic production of pork was only 0.45 metric ton and share of pork is around 8% of Country's total meat production (DARE Report, 2012–2013). The total pigs in the country have decreased by 7.54% over the previous census (i.e., 11.13 million in 18th Livestock Census, 2007). Because of the above situation, the increasing demand for pig, for its meat requires the production of fast-growing pigs as well as management systems that facilitate fast growth.

Growth is a fundamental property of all living organisms and can be defined as the increase in the number of cells and body size over a while. In studies of animal growth, linear body measurements (LBM) such as chest girth, height at withers and body length are used to relate dimensions to an animal's overall body size. This is because linear dimensions are directly related to bone development, and so any physical growth in LBM is easily noticed. LBM can be taken on many species and are useful in comparing individual animals, breeds of animals, farm performance and even geographical distribution of a species. The need to estimate live weight from simple and more easily measurable variables such as LBM is increasingly being explored in sheep, goats, cattle, and pigs (Birteeb *et al*., 2015)

The young pigs can grow very fast but, unfortunately, a number of factors including the milk produced by the sows are the major factor limiting piglet growth till weaning (Pluske *et al*., 2005; Hartmann *et al*., 1984). While piglets are exposed to many stressors immediately after birth, gastrointestinal problems are among the most severe. Such conditions when encountered can be overcome with effective nutritional management. Thus, in highly prolific sows, providing additional milk sources to suckling piglets will increase the nutrient intake of the piglets and, therefore, improve pre-weaning daily weight gain and weaning weights. Klindt *et al.* (2003) demonstrated that increasing nutrient availability during lactation is an important determinant of pre-weaning growth rates. Probiotics, sometimes used interchangeably with the term direct fed microbials (DFM), are gaining acceptance as potential alternatives to antibiotics to improve production efficiency (Lee *et al*., 2010).

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Pig keeping is of traditional value in many tribal areas of India, and thus any scientific inputs to enhance the overall performance of the piglets will help in strengthening this traditional practice sustainably. Therefore, the present work was designed to know if the changing body weight of piglets in the successive days of life maintains a relationship with the linear body measurements and if these body growth parameters are influenced by supplementation of probiotics and milk powder.

Materials and methods

The experiment was conducted during the period of 1st of October to 15th of December 2017. The feeding trial of the piglets was carried out at the 30-Sow Teaching Unit of the Department of Livestock Production and Management while laboratory analysis of feed and blood samples were done respectively in the Department of Animal Nutrition and Department of Animal Physiology as well as TVCC, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India. The animal experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC 770/ac/CPCSEA/FVSc/AAU/IAEC/17-18/535) and carried out as per the guidelines of the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA), Ministry of Environment, Forest and Climate Change, Government of India.

For the study, seven healthy piglets of uniform size and body weight from each of four Hampshire litters were selected, thus, four treatment groups were formed. Each group of the experimental piglets was randomly assigned to one of the four treatments as shown in Table 1.1.

The piglets together with their mothers were sheltered in conventional farrowing pens till weaning at 8 weeks of age. The floor of the pens was cement concrete and floor area was of 9 M^2 with an equal floor area in the outdoor run.

All the experimental piglets were raised entirely on their dams' milk from birth to 7 days of age. From day-8 onward, the piglets of T_0, T_1, T_2, and T_3 groups were offered respective experimental feed twice daily as per the feeding schedule up to weaning at 56 days of age. The piglets were separated from their sows daily in the morning and evening for a period of 1–2 hours following suckling and offered feed in the outdoor run and fed to appetite. The piglets were provided clean wholesome water ad libitum round the clock. Other day-to-day routine managemental tasks like cleaning of pens, disinfection of floors, washing of feeding and water troughs were strictly followed. The formula of the basal conventional farm ration and also compositions of the ration, milk powder, and probiotics used for the piglets are as shown in Tables 1.2 and 1.3, respectively. The proximate analyses of the feed samples were done as per methods described in AOAC (1990).

The individual body weight of the piglets was weighed using a hanging balance and recorded in kg in the morning before offering feed and water. The first (initial) body weights were recorded on the 1st week of life and then subsequently at weekly interval up to weaning at 56 days of age. The body weight gain of the piglets in a particular week was worked out by subtracting the previous week body weight from the present body weight and recorded in kg.

The body length of the piglets was measured as a straight-line distance from the occipital bone to the base of the tail with a measuring tape and expressed in centimeter (cm).

Heart girth of the piglets was taken as the circumference of the chest behind the elbow joint by placing the measuring tape around the animal at the point of the smallest chest circumference and were expressed in centimeter (cm).

Height at wither of the piglets was measured as the vertical distance from the top of the scapula bone to the ground parallel to the forelegs and was expressed in centimeter (cm).

Results and discussion

Body Weight

The average weekly body weight of the piglets of different treatment groups was presented in Table 2.1. Analysis variance of average body weight (Table 2.2) revealed no significant difference among the initial body weight of the piglets in all the four treatment groups, but the treatment had a significant effect (p <0.01) on average body weight of the piglets in all the subsequent weeks. The final average body weights at 8th week of age were significantly highest (p <0.01) in probiotics cum milk powder group (T_3) followed by probiotics (T_2), milk powder (T_1) and lowest in control group (T_0).

The findings indicated a positive effect of added supplement in the body weight of pre-weaned piglets

Table 1.1: Group wise feeding treatment of piglets

Treatment group	*No. of piglet*	*Average initial body weight (kg)*	*Experimental feed for the treatment groups*
T0 (Control)	7	2.280	Conventional farm feed
T1	7	2.314	Conventional farm feed + 5% supplementation of milk powder (SAGAR BRAND)
T2	7	2.315	Conventional farm feed+probiotics (PROBIOSR from VETS PLUS, Inc and CHR. Hansen) as per manufacturer's recommendation
T3	7	2.300	Conventional farm feed + 5% milk powder% probiotics as per manufacturer's recommendation

throughout the period up to 8 weeks age. The present findings are in agreement with the findings of King *et al.* (1998), who reported that litters given milk supplements grew faster than litters receiving no supplemental milk. Novotni-Danko *et al.* (2015) found significantly higher 14-day and weaning body weights of milk supplemented piglets than the control without supplementation. The findings are also supported by the studies of Venkatachalapathy *et al.* (2013) who found that concentrate feed mixture supplemented with multispecies probiotics strains showed significantly higher litter weight at weaning than the control fed only concentrate mixture.

Table 1.2: Ingredients of creep ration

Name of the ingredients	*Parts per hundred*
Maize crush	50
Wheat bran	12
Ground nut cake (de-oiled)	27
Fish meal	8
Mineral mixture	2.5
Salt	0.5
Vitamins (A,D,E,K)	Added @200 gm/100 kg feed

- *Body weight gain:* The average weekly body weight gains (kg) of piglets were presented in Table 2.3. In respect of the final weight gains in the 8th week, both T_2 and T_3 differed significantly (p <0.01) from T_0 and T_1 with no significant difference among themselves (Table 2.4). The piglets showed a trend of steady weekly gain from 2nd week onward and were highest in all the treatment groups.

The results of average body weight gains (Table 2.3) indicated that it maintained a positive relationship with

Table 1.3: Composition of farm ration, milk powder (Sagar brand) and probiotics (Probios)

Farm ration (%)		*Milk powder(Per 100gm)*		*Probiotics(Viable lactic acid bacteria/ gm)*	
DM (basal feed)	95	Energy(Kcal)	366	*Enterococcus faecium, Lactobacillus acidophilus,*	10 million CFU
DM (left over feed)	92	Total fat (gm)	1.5	*Lactobacillus casei and Lactobacillus plantarum*	
CP	22.1	Total carbohydrate (gm)	52		
EE	5.06	Protein (gm)	35		
CF	4.75	Sodium (mg)	549		
Total ash	7.75	Calcium (mg)	1200		
NFE	60.34				

Table 2.1: Average weekly body weight (kg) of piglets of different treatment groups

	Treatment groups			
Weeks	T_0	T_1	T_2	T_3
Initial body weight at 1st week of age	$2.280^{a} \pm 0.013$	$2.314^{a} \pm 0.023$	$2.315^{a} \pm 0.006$	$2.300^{a} \pm 0.013$
2nd	$2.758^{b} \pm 0.037$	$3.104^{a} \pm 0.036$	$3.175^{a} \pm 0.041$	$3.227^{a} \pm 0.057$
3rd	$3.360^{d} \pm 0.027$	$4.074^{c} \pm 0.041$	$4.229^{b} \pm 0.051$	$4.392^{a} \pm 0.031$
4th	$4.190^{c} \pm 0.034$	$5.059^{b} \pm 0.035$	$5.475^{a} \pm 0.116$	$5.602^{a} \pm 0.109$
5th	$5.220^{c} \pm 0.051$	$6.173^{b} \pm 0.111$	$6.745^{a} \pm 0.075$	$6.904^{a} \pm 0.037$
6th	$6.351^{c} \pm 0.014$	$7.371^{b} \pm 0.111$	$8.465^{a} \pm 0.045$	$8.440^{a} \pm 0.058$
7th	$7.500^{d} \pm 0.029$	$8.614^{c} \pm 0.103$	$9.425^{b} \pm 0.089$	$10.290^{a} \pm 0.084$
8th	$8.781^{d} \pm 0.073$	$9.940^{c} \pm 0.103$	$11.230^{b} \pm 0.094$	$12.395^{a} \pm 0.051$
Overall	$5.051^{d} \pm 0.296$	$5.831^{c} \pm 0.340$	$6.382^{b} \pm 0.398$	$6.694^{a} \pm 0.44$

(p <0.05); treatment means having atleast one common superscript in a row do not differ significantly

Table 2.2: Analysis of variance for weekly body weight of piglets of different groups

Source	*d.f*	*SS*	*MS*	*F value*	*p value*
Treatment	3	87.124	29.041	977.56	<0.0001
Weeks	7	1672.163	238.880	8040.90	<0.0001
Treatment* weeks	21	41.466	1.975	66.47	<0.0001
Error	192	5.704	0.030	–	–

Table 2.3: Average weekly body weight gain (kg) of piglets in different treatment groups

	Treatment groups			
Weeks	T_0	T_1	T_2	T_3
2nd	$0.508^{c} \pm 0.008$	$0.790^{b} \pm 0.030$	$0.860^{ab} \pm 0.033$	$0.927^{a} \pm 0.022$
3rd	$0.602^{c} \pm 0.007$	$0.970^{b} \pm 0.49$	$1.050^{b} \pm 0.032$	$1.165^{a} \pm 0.017$
4th	$0.816^{d} \pm 0.013$	$0.985^{c} \pm 0.026$	$1.075^{b} \pm \pm 0.028$	$1.210^{a} \pm 0.029$
5th	$1.030^{c} \pm 0.017$	$1.100^{b} \pm 0.031$	$1.250^{a} \pm 0.025$	$1.302^{a} \pm 0.014$
6th	$1.157^{b} \pm 0.075$	$1.212^{b} \pm 0.028$	$1.270^{b} \pm 0.030$	$1.535^{a} \pm 0.027$
7th	$1.150^{c} \pm 0.035$	$1.243^{c} \pm 0.013$	$1.720^{b} \pm 0.049$	$1.850^{a} \pm 0.032$
8th	$1.280^{c} \pm 0.033$	$1.330^{c} \pm 0.045$	$1.805^{b} \pm 0.053$	$2.105^{a} \pm 0.045$
Overall	$0.935^{d} \pm 0.042$	$1.090^{c} \pm 0.028$	$1.290^{b} \pm 0.049$	$1.442^{a} \pm 0.056$

(p <0.05)

Treatment means having atleast one common superscript in a row do not differ significantly

Table 2.4: Analysis of variance for weekly body weight gain (kg) of piglets of different treatment groups

Source	*d.f*	*SS*	*MS*	*F value*	*p value*
Treatment	3	7.289	2.430	308.14	<0.0001
Weeks	6	15.626	2.604	330.30	<0.0001
Treatment*Weeks	18	1.966	0.109	13.86	<0.0001
Error	168	1.325	0.008	–	–

body weight change in different weeks and were found to be highest in T_3 followed by T_2, T_1 and T_0 group. The differences were significant among all the four treatment groups. Researchers like Rava (1991) found that milk powder supplementation in diet gained significantly higher weight gain than the unsupplemented piglets. In respect of the beneficial effect of probiotics supplementation, Pollmann *et al*. (1980) found PROBIOS to improve 4.5% average daily gain than the no PROBIOS group. They also found in another experiment that addition of PROBIOS with lactose in feed tended to improve average daily gain in starter pigs. Abe *et al*. (1995) in a trial, obtained higher body weight gain in probiotics fed newborn piglets than the control. On the contrary, Shim *et al*. (2005) and Lahteinen *et al*. (2015) found no significant effect of dietary supplementation of probiotics on body weight gain in piglets. This result difference to the present findings may be due to difference managemental practice, agro-climatic conditions, and type of probiotics used.

Linear Body Measurements

Body Length

The average weekly values of body length (cm) of different treatments were presented in Table 2.5. The finding indicated that the average weekly body length of piglets in all the groups was increased throughout the experimental period and had significant difference (as shown in Table 2.6) among the treatment means in 2nd, 7th and 8th weeks. The average weekly body length in group T_0 was significantly (p <0.01) lower than both T_2 and T_3 while T_1 differed significantly only from T_3 and there was no significant difference between T_2 and T_3. However, on an overall basis, the body length was highest in T_3 and gradually reduced in T_2, T_1, and T_0 group. This was due to the corresponding higher body weights of the piglets in the respective treatments and established a positive correlation of body length with body weight change and gain of the piglets. Kharpran (2014) in his research of feeding brewing yeast cake, found no significant difference of body length of piglets in 2nd weeks of age but observed the highly significant difference (p <0.01) from 6th week. On the other hand, the present range of body length of 23.86 ± 0.43 to 25.36 ± 0.34 cm at the 1st week and 40.57 ± 1.65 to 45.86 ± 1.39 cm at 8th week were well comparable with findings of Bordoloi (1974) and Roychoudhury (1978).

Heart Girth

The average weekly values of heart girth (cm) of different treatments were presented in Table 2.5, and it was an increasing trend throughout the experimental period. Analysis of variance (Table 2.6) showed highly significant (p <0.01) effect of treatment on this parameter. The overall values of T_1, T_2, and T_3 were not significantly different among themselves, but they all were significantly higher than the T_0 value. This was due to the corresponding higher body weights of the piglets in the respective treatments and established a positive correlation of heart girth with the body weight of the piglets. The result also revealed significant (p <0.01) effect of treatment on heart girth in 2nd, 7th and 8th week of age. Kharpran (2014) in his research of feeding brewing yeast cake, found no significant difference of heart girth of piglets in 2nd weeks of age but observed the highly significant difference (p <0.01) from a 6th week in 3% and 4% brewing yeast cake supplemented piglets. The present range of 23.93 ± 0.38 to 25.44 ± 0.81 cm at the 1st week and 37.29 ± 1.32 to 43.93 ± 1.03 cm at 8th week were well comparable with findings of Bordoloi (1974) and Roychoudhury (1978).

Table 2.5: Average weekly body length (cm), heart girth (cm) and height at wither (cm) of piglets of different treatment groups

		Groups			
Weeks		T_0	T_1	T_2	T_3
1st	BL	23.86 ± 0.43	25.24 ± 0.72	25.30 ± 1.15	5.36 ± 0.34
	HG	23.93 ± 0.38	25.04 ± 0.90	25.43 ± 0.30	25.44 ± 0.81
	HW	8.43 ± 0.20	18.80 ± 0.30	18.93 ± 0.41	19.01 ± 0.46
2nd	BL	27.14 b ± 0.55	27.43^{b} ± 0.25	29.21ab ± 1.21	30.86 a ± 1.03
	HG	27.07 b ± 0.65	27.71^{b} ± 0.26	28.86 ab ± 1.32	31.21 a ± 0.90
	HW	18.79 b ± 0.26	19.79^{ab} ± 0.32	19.86 ab ± 0.86	21.36 a ± 0.71
3rd	BL	29.07 ± 0.62	30.57 ± 1.11	31.86 ± 0.98	31.93 ± 1.07
	HG	29.79 ± 0.60	31.36 ± 0.94	31.50 ± 1.27	32.00 ± 1.12
	HW	20.36 ± 0.51	21.50 ± 0.62	22.00 ± 0.85	22.21 ± 0.66
4th	BL	32.21 ± 0.69	33.29 ± 1.14	33.57 ± 0.88	34.29 ± 1.09
	HG	32.07 ± 0.68	33.21 ± 0.89	33.71 ± 1.19	33.86 ± 0.94
	HW	22.36 ± 0.63	22.86 ± 0.57	23.71 ± 0.54	24.36 ± 0.40
5th	BL	34.50 ± 1.02	35.43 ± 0.53	36.21 ± 0.93	38.07 ± 1.20
	HG	34.86 ± 0.37	35.14 ± 0.70	36.00 ± 1.03	36.71 ± 1.11
	HW	24.43 ± 0.43	25.00 ± 0.76	25.07 ± 0.83	26.93 ± 2.04
6th	BL	35.57 ± 0.61	36.79 ± 1.01	38.21 ± 1.42	39.21 ± 1.01
	HG	35.57 ± 0.92	36.86 ± 1.29	37.71 ± 1.38	38.71 ± 0.86
	HW	25.71 ± 0.57	26.76 ± 0.72	27.43 ± 0.78	28.36 ± 0.85
7th	BL	37.29^{b} ± 1.51	38.71^{ab} ± 0.99	40.43^{ab} ± 1.91	43.00 a ± 1.02
	HG	36.79^{b} ± 1.35	37.71^{b} ± 1.01	39.57^{ab} ± 1.46	42.21 a ± 1.06
	HW	26.71^{b} ± 1.24	27.21^{b} ± 0.59	27.86^{b} ± 0.71	30.79 a ± 0.63
8th	BL	40.57^{b} ± 1.65	40.64 ^{b} ± 1.31	45.21^{a} ± 1.24	45.86 a ± 1.39
	HG	37.29^{c} ± 1.32	39.14^{bc} ± 1.06	42.00^{ab} 1.286	43.93 a ± 1.03
	HW	27.00^{b} ± 1.23	28.64 ^{b} ± 0.61	31.86^{a} ± 0.58	32.21 a ± 1.25
Overall	BL	32.68^{c} ± 0.77	34.02^{b} ± 0.59	35.00^{ab} ± 0.96	35.41 a ± 0.87
	HG	32.25^{b} ± 0.66	33.77^{a} ± 0.54	34.47^{a} ± 0.75	34.82 a ± 0.90
	HW	23.21^{b} ± 0.53	24.49^{a} ± 0.63	24.53^{a} ± 0.50	24.80 a ± 0.68

(p <0.05)
Treatment means having atleast one common superscripts in a row do not differ significantly.

Table 2.6: Analysis of variance for weekly body length (cm), heart girth (cm) and height at wither (cm) of piglets of different treatment groups

Parameters	*Source*	*d.f*	*SS*	*MS*	*F value*	*p value*
BL	Treatment	3	295.192	98.397	11.01	<.0001
	Weeks	7	6186.246	883.749	98.92	<.0001
	Error	213	1903.022	8.934	–	–
HW	Treatment	3	253.557	84.519	10.62	<.0001
	Weeks	7	4793.258	684.751	86.01	<.0001
	Error	213	1695.845	7.962	–	–
BG	Treatment	3	129.085	43.028	8.82	<.0001
	Weeks	7	3243.515	463.359	94.96	<.0001
	Error	213	1039.341	4.878	–	–

- *Height at wither:* The average weekly height at wither of piglets in all the groups (Table 2.5) were in increasing trend throughout the experimental period. Analysis of variance (Table 2.6) revealed a significant effect of treatment on this trait in 2nd, 7th and 8th week of age. The overall values of T_1, T_2, and T_3 were not significantly different among themselves, but they all were significantly higher (p <0.01) than the T_0 value. This was due to the corresponding higher body weights of the piglets in the respective treatments and indicated a positive correlation of height at wither with the body weight of the piglets. Kharpran (2014) in his research of feeding brewing yeast cake, found no significant difference of height at wither of piglets in 2nd weeks of age but observed the highly significant difference (p <0.01) at 7th and 8th week in piglets fed 3% and 4% brewing yeast cake supplemented ration. Also, the range of 18.43 ± 0.20 to 19.01 ± 0.46 and 27.00 ± 1.23 to 32.21 ± 1.25 cm height at wither at first and 8th week were well comparable with findings of Bordoloi (1974) and Roychoudhury (1978).

Estimating the Relation of Body Weight with Linear Body Measurement

The correlation coefficient of body weight with the linear body measurement in the different treatments of T_0, T_1, T_2, and T_3 are shown in Table 2.7. Analysis of the data revealed a highly significant correlation (p <0.01) of these traits with the body weight of the piglets in all the treatment groups. The high correlations of the traits indicate that LBM (body length, chest girth, and height at withers) have strong relationships with one another and that body length, heart girth, and height at wither increased with a corresponding increase in body weight of the piglets in different weeks. The present findings were in good agreement with findings of Birteeb *et al*. (2015) who reported correlation coefficient of body weight with body length as 0.862 and 0.854; with heart girth as 0.963 and 0.903 and with height at wither as 0.867 and 0.809 in piglets at 5 and 10 weeks of age and all correlation values were highly significant. Machebe *et al*. (2010) and Kharpran (2014) observed a similar correlation of body weight with body length, heart girth, and height at wither.

Table 2.7: Correlation coefficient of body weight with linear body measurements of piglets of different treatment groups

		Body weight								
Treatment	*Week*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*Overall*
T_0	BL	0.909**	0.767*	0.981**	0.661	0.864*	0.821*	0.952**	0.956**	0.898**
	p value	0.005	0.044	0	0.106	0.012	0.024	0.001	0.001	0
	HG	0.924**	0.834*	0.971**	0.558	0.965*	0.984**	0.944**	0.881*	0.857**
	p value	0.003	0.02	0	0.193	0	0	0.001	0.009	0
	HW	0.834*	0.931**	0.951**	0.462	0.961**	0.960**	0.922**	0.979**	0.863**
	p value	0.02	0.002	0.001	0.296	0.001	0.001	0.003	0	0
T_1	BL	0.867*	0.748	0.924**	0.884**	0.896**	0.974**	0.968**	0.888**	0.886**
	P value	0.012	0.053	0.003	0.008	0.006	0	0	0.008	0
	HG	0.950**	0.705	0.939**	0.994**	0.868*	0.932**	0.897**	0.894**	0.863**
	p value	0.001	0.077	0.002	0	0.011	0.002	0.006	0.007	0
	HW	0.856*	0.848*	0.847*	0.910**	0.843*	0.919**	0.883**	0.856*	0.917**
	p value	0.014	0.016	0.016	0.004	0.017	0.003	0.008	0.014	0
T_2	BL	0.762*	0.961**	0.974**	0.816*	0.774*	0.938**	0.937**	0.916**	0.885**
	p value	0.047	0.001	0	0.025	0.041	0.002	0.002	0.004	0
	HG	0.790*	0.938**	0.903**	0.865*	0.686	0.931**	0.953**	0.996**	0.880**
	p value	0.035	0.002	0.005	0.012	0.089	0.002	0.001	0	0
	HW	0.784*	0.881**	0.871*	0.810*	0.973**	0.926**	0.953**	0.966**	0.931**
	p value	0.037	0.009	0.011	0.027	0	0.003	0.001	0	0
T_3	BL	0.963**	0.977**	0.909**	0.952**	0.955**	0.935**	0.697	0.946*	0.922**
	P value	0	0	0.005	0.001	0.001	0.002	0.082	0.001	0
	HG	0.818*	0.981**	0.840*	0.926**	0.926**	0.896**	0.705	0.927**	0.917**
	p value	0.025	0	0.018	0.003	0.003	0.006	0.077	0.003	0
	HW	0.926**	0.892**	0.933**	0.924**	0.855*	0.919**	0.872*	0.942**	0.892**
	p value	0.003	0.007	0.002	0.003	0.014	0.003	0.011	0.002	0

Conclusion

In any livestock farming proposition, the body weight of the animals in different ages was always the most important criterion that affected their productive and reproductive performances. This even held more significant in a meat production entity like pig farming for pork production. The study found that piglets fed with probiotics and milk powder combine (T_3) showed better body growth with increasing body weight and weight gain followed by piglets group fed with probiotics (T_2) and milk powder (T_1) as compared to the control basal fed group (T_0). Linear body measurements like body length, heart girth, and height at wither of the piglets increased proportionately with the rate of body growth in the treatment order as above and showed a high correlation with body weight. Thus, the weight of piglets can be predicted with high accuracy using linear body measurements. In the end, it can be concluded that feeding of suitable probiotics is always beneficial while simultaneous enrichment of the feed with a nutritious supplement like milk powder is even better for the piglets to attain maximum weight at weaning and might affect their post-weaning growth performance.

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