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Estimation of effect of breeding bulls and genetic parameters on early growth performance of calves at farm and field levels

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Abstract

The present study was conducted using records on four breeding bulls maintained at the Artificial Insemination (AI) Center of Bangladesh Agricultural University (BAU), Mymensingh and on 154 of their progeny maintained at BAU Dairy Farm (112) and some villages (42 progeny) adjacent to BAU for estimating the effect of breeding bulls and genetic parameters on early growth performance of the progeny at farm and field levels. Genetic correlations between traits of bulls and their progeny were also estimated. Bull traits were metabolic body weight (MWT), feed intake (FI) and residual feed intake (RFI) where progeny traits were birth weight (BWT), final body weight (FWT) at 90 days of age and average daily gain (ADG). Mean BWT of progeny at farm and field level was 16.34±1.85 to 17.62±1.97 kg and 13.89±2.78 to 16.11±2.98 kg, respectively. The FWT at farm progeny was 48.9±2.87 to 55.67±2.14 kg whereas 43.43±2.50 to 52.22±3.34 kg for field progeny. The ADG at farm and field progeny was 0.36±0.03 to 0.43±0.01 and 0.32±0.03 to 0.42±0.03 kg, respectively. The BWT and FWT of farm progeny were significantly ($p>0.05$) higher than the progeny of field level. Breeding bulls had significant ($p<0.05$) effect on FWT and ADG for both of the farm and field progeny. Estimated heritability was found to be moderate in case of BWT (0.32±0.19), but low for FWT (0.26±0.18) and ADG (0.29±0.20) for pooled average. The genetic correlation between bulls' MWT and BWT was high (r_g=0.54±0.17), but low with FWT (r_g=0.26±0.18) and ADG (r_g=0.28±0.23). Moderate in daily FI of bulls was genetically correlated with BWT (0.45±0.22), FWT (0.38±0.24) and ADG (0.35±0.25) for their progeny, while low but favorable negative genetic correlation (r_g=-0.13±0.17) was observed between ADG of progeny and RFI of bulls. The negative correlation for RFI with ADG suggested that selection might result in better success in improving herd production efficiency without compromising progeny growth performance.

Key words: Breeding bulls, genetic parameters, growth traits, progeny, residual feed intake

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Introduction

The cattle are most promisingly inseparable and integral part of existing farming system of Bangladesh. Although concentration of cattle in Bangladesh is high, but their productivity is low mainly due to inadequate feed supply and low genetic potentiality. As a result their growth performance is very poor. In this situation to get quality progeny for increasing milk and beef production, superior breeding bull may be considered as important factor. There are many cost–worthy matters involved with cattle improvement for milk and beef production. In many of the cases, profitability depends on the efficient and productive use of feed. As a result feed efficient breeding bulls selection may be considered as major factor, because 80 to 90% of the genetic improvement comes through the sires and bull passes on superior genetics for feed efficiency to its progeny which might be realized as feed saving for calves in the feedlot and for replacement heifers entering the herd (Trejo, 2010). It might be beneficial to estimate effect of reducing extra feed intake of bull on progeny growth performances which will be helpful to take decision in breeding program. Residual feed intake (RFI) is receiving greater attention as the preferred feed efficiency measure due to its favorable or negligible phenotypic and genetic relationships with feed intake, daily gain, FCR, and body weight (Arthur et al. 2001a,b; Hoque et al. 2006; Ahola et al. 2007). The RFI analysis among cattle is defined as the difference between the actual feed intake and the expected feed intake of each animal was first proposed as an alternative measure of feed efficiency by Koch et al. (1963). Inefficient animals will eat more than expected and their RFI value will be positive or high (Lancaster et al. 2005). The early study

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(Aktar et al. 2011) has so far been carried out on farm progeny and their sire evaluation and considering the aforesaid matters, this study was made to evaluate the effect of breeding bulls on their progeny early growth performance at farm and field levels and to estimate the relationships between progeny and sire traits along with genetic parameters for early growth traits of progeny tested at farm and field levels.

Materials and Methods

The experiment was conducted partly at the Artificial Insemination (AI) Center under the Department of Animal Breeding and Genetics and the dairy farm (DF) under the Department of Dairy Science of BAU, Mymensingh. Besides, at farmers' level, data were collected from some villages adjacent to BAU namely Boera, Digharkanda, Shikarikanda and Bhabakhali. Bull performance (feed intake and body weight) data were used during the period from January, 2010 to December, 2010 (Aktar et al. 2011). Performance records on progeny (birth weight and weight at 3 months of age) were collected from DF during the period from January, 2011 to December, 2011. The information on field progeny (birth weight and weight at 3 months of age) were collected separately with the help of the cow's owner for each of the progeny from respective cows inseminated by the semen of the experimental bulls at AI centre.

Breeding bulls were stall-fed and uniformly provided with 50% green grass and 50% straw on live weight basis in addition to a concentrate mixture of mustard oil cake, wheat bran and common salt at the rate of 1 kg/bull/day. Roughages (green grass and straw) and concentrate feeds were supplied twice daily in the morning and evening. Fresh water was provided *ad libitum*. Monthly body weights of breeding bulls were recorded using the portable weighing balance. Average metabolic body weight, daily feed intake and residual feed intake of the breeding bulls estimated by Aktar et al. (2011) at AI center are presented in Table 1. Bull performance traits were recorded for daily feed intake, metabolic body weight and RFI. Daily feed intake was measured by the difference between supplied and leftover feed. Metabolic body weight was calculated likewise the MWT and raised to the power of 0.75 as $MWT^{0.75}$. The residual feed intake (RFI) may be calculated from the difference between the animal's actual intake and what quantify of feed supplied as RFI = Actual intake – Predicted intake. But in present study, the RFI was estimated as the difference between actual feed intake and that predicted from single trait analysis for daily feed intake with metabolic body weight using Statistical Analysis system (SAS) software as described by Hoque and Oikawa (2004) as follows:

$$\mathbf{RFI = FI - MWT \times \beta_w - Intercept}$$

where, RFI = Residual feed intake, FI = Daily feed intake, MWT = Metabolic body weight, β_w= Regression coefficients of animal's FI on MWT.

Farm and field progeny management

The calves born at BAU Dairy Farm were reared. Farm progeny were reared in groups in the calf shed, and provided them a plenty of green grass and *ad libitum* water. Concentrate feeds were also supplied to them twice daily in the morning and evening. A regular vaccination and medication were given to each of the calf. Due to illiteracy and lack of credit facilities, village farmers were incapable of rearing their animals scientifically. Calves were born and grown in various farmers house of selected villages. No special treatments were given to the field progeny as progeny reared at farm. Moreover, feed scarcity and cost of feed was the liable factor for poor feeding management of field progeny as well.

Table 1. Average metabolic body weight, daily feed intake and residual feed intake of the breeding bulls at AI center (Aktar et al. 2011)

Bull ID	Genotype	Age of bull	Mean±SE (332)*		
			MWT (kg)	FI (kg/day)	RFI (kg/day)
122	Sindhi cross	8.50 years	106.05±2.28	24.14^{b}±2.77	-0.37±0.07
131	Friesian cross	8.25 years	97.10±1.62	23.97^{b}±2.87	0.31±0.05
143	Sahiwal cross	4.5 years	92.88±1.22	22.85^{a}±2.88	-0.29±0.07
2858	Friesian cross	5.4 years	102.36±1.31	24.82^{c}±2.66	0.54±0.06

**No. of observations (n=322) for each bull; ID, identity; SE, standard error; MWT, metabolic body weight; FI, feed intake; RFI, residual feed intake. Means with different superscripts within the same column differed significantly (p<0.05)*

Data structure and information collection

Four breeding bulls of BAU AI centre, and 112 and 42 of their progeny from the farm and field levels were evaluated for performance records. Among the 4 bulls, 2 were Friesian crosses (ID No. 131 and ID No. 2858), 1 of Sindhi crosses (ID No. 122.), and 1 of Sahiwal crosses (ID No. 143). In case of field progeny, the sire-dam-calves records were collected from the register book of AI centre. The birth weight and final weight (90 days of age) of the progeny resultant from the breeding bulls of AI center for both of the farm and field levels were measured by using the digital portable weighing balance and data were recorded during the study period from January–December, 2011. The information of those calves born before the study period (2005–2010) were also collected from the herd book of BAU dairy farm and recorded. The average daily gain for calves was calculated from the difference between birth weight and final weight (90 days weight), and finally dividing it by the number of days (90).

Statistical analysis

The analyses of variances were estimated using the Statistical Analysis System (SAS, 1998) computer program. A pedigree file was constructed for estimating the heritability and genetic correlation. The covariance for genetic correlation was estimated by the Residual Maximum Likelihood (REML) method with the Variance Component Estimate (VCE) program (Neumarier and Groeneveld, 1998). The covariance components were estimated in a series of two-trait animal models (one bull trait and one progeny trait or one field progeny trait and one farm progeny trait).

Covariance structure for additive genetic effects of animals and residual effects:

$$Var\begin{pmatrix} a_1 \\ a_2 \\ e_1 \\ e_2 \end{pmatrix} = \begin{bmatrix} A\sigma_{a1}^2 & A\sigma_{a12} & \mathbf{0} & \mathbf{0} \\ & A\sigma_{a2}^2 & \mathbf{0} & \mathbf{0} \\ & & I\sigma_{e1}^2 & I\sigma_{e12} \\ sym. & & & I\sigma_{e2}^2 \end{bmatrix}$$

where, a_1 and a_2 are the vectors of additive genetic effects of animal for a bull trait and a progeny trait, respectively, and e_1 and e_2 are the residual effects for them. A is the numerator relationship matrix consisting of the genetic relationships between animals. The $\sigma_2 a_1$ and $\sigma_2 a_2$ are the additive genetic variances for a bull trait and a progeny trait, respectively, and $\sigma_2 a_{12}$ is the additive covariance for them. The $\sigma_2 e_1$ and $\sigma_2 e_2$ are the residual variances for a bull trait and a progeny trait, respectively, and $\sigma_2 a_{12}$ is the residual covariance for them. Since the two traits were recorded on different animals, the $\sigma_2 a_{12}$ was assumed to be zero.

Results

Progeny performance

Table 2 and 3 show the average BWT, FWT and ADG for male and female along with pooled average, and Table 4 shows the mean BWT, FWT and ADG (Ignoring sex & sire group, and ignoring sire group) of progeny at farm and field levels. The average BWT was 16.67±2.34 and 14.62±3.45 kg of calves for Sindhi cross (122), 17.62±1.97 and 16.11±2.98 Kg for Friesian cross (131), 16.34±1.85 and 14.13±3.45 kg for Sahiwal cross (143), and 16.99±1.77 and 13.89±2.78 kg for Friesian cross (2858) at farm and field levels, respectively. Similarly, FWT was 48.9±2.87 and 43.43 ±2.50kg of calves for bull 122, 55.57±2.45 and 50.62±2.93 kg for 131, 50.78±2.34 and 52.22±3.34 kg for 143, and 55.67±2.14 and 51.44±3.87 kg for 2858 at farm and field levels, respectively. Daily gain of calves at farm vs. field progeny were 358.22±33.46 and 320.1±32.50 g for bull 122, 421.67±31.34 and 383.44±34.21g for 131, 382.67±27.13 and 423.22 ±29.56 g for 143, and 429.78±13.67 and 417.23 ±42.30 g for 2858, respectively. With ignoring sex and sire group, the mean BWT, FWT and ADG were 16.94^{a}±1.96 and 14.70^{b}±1.86 kg, 52.32^{a}±2.10 and 49.20±1.98 kg, and 393.11±29.21 and 383.29±27.77 g at farm and field levels, respectively. However, ignoring sire group the mean BWT, FWT and ADG were 18.38 ±2.24 and 16.16±3.04 kg, 54.16 ±2.66 and 51.48 ±2.99 kg, 408.59±29.35 and 392.32 ±33.36 g for male, and 15.55±3.07 and 12.75±3.33 kg, 50.60±2.95 and 46.17±3.54 kg, 388.62±31.82 and 371.25 ±34.40 g for female at farm and field levels, respectively.

Table 2. Average birth weight, final weight and daily gain of progeny of the different bulls at farm levels

Bull ID	Male			Female			Pooled		
	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/day)	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/d)	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/d)
122	17.9±2.1 (18)	50.9^{b}±2.6 (18)	367^{b}±32 (18)	15.3±3.2 (16)	46.9^{b}±2.9 (16)	350^{b}±36 (16)	16.7±2.3 (34)	48.9^{b}±2.9 (34)	360^{b}±16 (34)
131	18.8±2.3 (20)	57.1^{a}±2.5 (20)	426^{a}±30 (20)	16.3±3.2 (18)	53.8^{a}±2.9 (18)	411^{a}±35 (18)	17.6±1.9 (38)	55.6^{a}±2.5 (38)	420^{a}±18 (38)
143	18.1±2.1 (11)	53.8^{b}±2.9 (11)	396^{b}±29 (11)	15.3±2.8 (18)	48.9^{b}±2.8 (18)	374^{b}±26 (18)	16.3±1.9 (29)	50.8^{b}±2.3 (29)	380^{b}±19 (29)
2858	18.9±2.5 (6)	54.7^{a}±2.8 (6)	496^{a}±19 (6)	14.6±3.2 (5)	56.9^{a}±3.7 (5)	479^{a}±26 (5)	16.9±1.8 (11)	55.7^{a}±2.1 (11)	430^{a}±22 (11)

ID, identity; SE, standard error; BWT, birth weight; FWT, final body weight; ADG, average daily gain and figures in the parenthesis indicate the number of observations. Means with different superscripts within the same column differed significantly ($p<0.05$)

Table 3. Average birth weight, final weight and daily gain of progeny of the different bulls at field levels

Bull ID	Male			Female			Pooled		
	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/day)	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/d)	BWT±SE (kg)	FWT±SE (kg)	ADG±SE (g/d)
122	15.6^{ab}±3.1 (7)	45.5±2.5 (7)	331±32 (7)	13.2^{ab}±3.2 (5)	40.6^{b}±2.9 (5)	304^{b}±31 (5)	14.6±3.5 (12)	43.4^{b}±2.5 (12)	320^{c}±30 (12)
131	18.1^{a}±2.7 (5)	53.3±2.9 (5)	391±36 (5)	14.1^{a}±3.2 (5)	47.9^{a}±3.2 (5)	375^{a}±31 (5)	16.1±2.9 (10)	50.6^{a}±2.9 (10)	380^{b} ±32 (10)
143	16.0^{ab}±3.5 (8)	54.2±3.1 (8)	424±31 (8)	11.1^{b}±3.2 (5)	49.0^{a}±3.9 (5)	421^{a}±39 (5)	14.1±3.5 (13)	52.2^{a}±3.3 (13)	420^{a}±30 (13)
2858	14.9^{b}±2.6 (4)	54.1±3.8 (4)	435±38 (4)	12.5^{ab}±4.0 (3)	47.8^{a}±4.5 (3)	393^{a}±39 (3)	13.9±2.8 (7)	51.4^{a}±3.8 (7)	420^{a}±40 (7)

ID, identity; SE, standard error; BWT, birth weight; FWT, final body weight; ADG, average daily gain and figures in the parenthesis indicate the number of observations. Means with different superscripts within the same column differed significantly ($p<0.05$)

Table 4. Mean birth weight, final weight and average daily gain of calves at farm and field levels

Ignoring sex and sire group						Ignoring sire group											
BWT±SE (kg)		FWT±SE (kg)		ADG±SE (g/d)		BWT±SE (kg)				FWT±SE (kg)				ADG±SE (g/d)			
						Farm		Field		Farm		Field		Farm		Field	
Farm	Field	Farm	Field	Farm	Field	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
16.94^{a}±1.96 (112)	14.70^{b}±1.86 (42)	52.32^{a}±2.10 (112)	49.20^{b}±1.98 (42)	393.11±29.21 (112)	383.29±27.77 (42)	18.38 ±2.24 (55)	15.55 ±3.07 (57)	16.16 ±3.04 (24)	12.75 ±3.33 (18)	54.16 ±2.66 (55)	50.60 ±2.95 (57)	51.48 ±2.99 (24)	46.17 ±3.54 (18)	408.59 ±29.35 (55)	388.62 ±31.82 (57)	392.32 ±33.36 (24)	371.25 ±34.40 (18)

BWT, birth weight; FWT, final weight; ADG, average daily gain; SE, standard error; and Means with different superscripts differed significantly ($p<0.05$); figures in the parentheses indicate the number of observation

Table 5. Heritability of progeny traits and genetic correlations of traits between farm and field progeny

Parameters			Field progeny		
			BWT	FWT	ADG
Farm progeny	h^2±SE	*Pooled data	0.32±0.19	0.26±0.18	0.29±0.20
	r_g±SE	BWT	0.86±0.21	0.75±0.32	0.91±0.31
		FWT	0.89±0.20	0.78±0.30	0.89±0.28
		ADG	0.82±0.26	0.82±0.29	0.93±0.10

Table 6. Genetic correlations between growth traits of progeny (pooled data of farm and field level) and bull traits

Progeny traits	Bull traits (r_g±SE)		
	MWT	FI	RFI
BWT	0.54±0.17	0.45±0.22	0.06±0.18
FWT	0.26±0.18	0.38±0.24	0.10±0.21
ADG	0.28±0.23	0.35±0.25	-0.13±0.17

BWT, birth weight; FWT, final weight; ADG, average daily gain; MWT, metabolic body weight; FI, feed intake; RFI, residual feed intake.

Heritability and genetic correlations

Heritability of progeny traits and genetic correlations of traits between farm and filed progeny is shown in Table 5. Average heritability pooled data for BWT, FWT and ADG was 0.32±0.19, 0.26±0.18 and 0.29±0.20, respectively. The genetic correlations between the BWT for field progeny with the BWT, FWT and ADG of farm progeny were 0.86±0.21, 0.89±0.20 and 0.82±0.26, respectively. Similarly the correlations between FWT of field progeny with BWT, FWT and ADG of farm progeny were 0.75±0.32, 0.78±0.30 and 0.82±0.29, respectively. Once more these correlations between ADG of field progeny with the BWT, FWT and ADG of farm progeny were 0.91±0.31, 0.89±0.28 and 0.93±0.10, respectively.

Genetic correlations (r_g±SE) between early growth traits for pooled mean BWT, FWT and ADG of farm and field progeny, and bull traits for MWT, FI and RFI is presented in Table 6. The genetic correlation between MWT of bull with BWT, FWT and ADG of progeny were 0.54±0.17, 0.26±0.18 and 0.28±0.23, respectively. Likewise the correlations between FI, and BWT, FWT and ADG were 0.45±0.22, 0.38±0.24 and 0.35±0.25, respectively. Equally the correlations between the RFI of bull with the BWT, FWT and ADG of progeny were 0.06±0.18, 0.10±0.21 and -0.13±0.17, respectively.

Discussion

The estimated value of mean BWT was comparable to the value observed by Aktar *et al*. (2011) at farm level. They used breeding bulls like 122, 131, 143 and 2858 (those were also used in present experiment) and found mean BWT of 16.43±2.50, 17.51±2.09, 16.15±2.01 and 17.71±1.89 kg, respectively at BAU dairy farm (DF). Nahar et al. (1992) reported the average BWT of different genetic groups like Sahiwal × Local, Sindhi x Local, Jersey × Local and Holstein × Local under rural condition as 17.6±0.3, 16.1±0.2, 17.7±0.2 and 21.4±0.2 kg, respectively. But this result was somewhat be higher to the present experiment at field level. Another study on birth weight of Red Chittagong cattle by Khan et al. (2000) reported to be 17.28 and 16.00kg at farm and rural levels, respectively which were also close to the present findings. Uddin (2001) and Bhuiyan et al. (1992) estimated mean BWT values of 20.95 and 21.18 kg, respectively for local cattle at farm level, both of which were higher than the present findings at farm level. An experiment was conducted by Bhuiyan (1999) using the data on Friesian and Friesian x Local grades of cattle at the Central Cattle Breeding Station and Dairy Farm, Savar, Dhaka and recorded the average birth weight of 27.50±0.79 and 23.05±0.32 kg, respectively were heavier than the present records of both at farm and field levels.

Significantly ($p<0.05$) higher FWT (Table 2) was observed in farm progeny of bull ID No.131 and 2858 than that of the progeny of bull ID No. 122 and 143. The pooled FWT for field progeny (Table 3) of Friesian cross bulls (131 and 2858) and Sahiwal cross bulls (143) were significantly ($p<0.05$) higher than the progeny of Sindhi cross bulls (122). The mean values of FWT for both of farm and field progeny range from 48.9±2.87 to 55.67±2.14 kg and 43.43±2.50 to 52.22±3.34 kg, respectively were greater than the value as 31.48 kg observed by Rabeya (2008). Coopman et al. (2007) found 98 and 96 kg FWT of male and female, respectively for double-muscled Belgian Blue beef cattle that were remarkably higher than the present study.

Comparatively similar ADG was estimated for the progeny of bull ID No. 2858 at farm and field (Table 2 and 3) levels. The ADG for farm progeny range from 0.36±0.03 to 0.43±0.01 g/d (Table 2) was almost similar to the values of 0.36±0.02 to 0.42±0.03 g/d was observed by Aktar et al. (2011) although their observation slightly varied with the values of 0.32±0.03 to 0.42±0.04 g/d (Table 3) for field progeny of the present study. Hoque et al. (2006) estimated an ADG of 1.23±0.01 g/d for Japanese Black cattle was immensely higher than that found for both of farm and field progeny in present investigation.

Ignoring sex and sire group, the mean BWT (Table 4) for farm progeny was significantly ($p<0.05$) higher than the field, but these values (both for farm and field) were lower than the values (17.15±2.25 and 16.46±2.19 kg for male and female, respectively) established by Aktar et al. (2011). Habib et al. (2003) observed 16.7±0.48 kg BWT for Red Chittagong cattle was almost similar to 16.94±1.96 kg, though somewhat higher to 14.70±1.86 kg found in present study. In considering sex, there was no remarkable variation of BWT of Aktar et al. (2011) and those found in present study for both levels with an exception for female progeny at field level (Table 4).

Heritability and genetic correlations

The estimated mean heritability was moderate (0.32±0.19) and close to moderate (0.29 ±0.20) for BWT and ADG, respectively which agreed to the heritability found (0.30±0.20) by Aktar et al. (2011), but low (0.26±0.18) for FWT. Akbulut et al. (2002) estimated a corresponding heritability value of 0.29±0.148 for Brown Swiss calves. Oikawa *et al.* (2000) estimated heritability (0·20 to 0·38) for growth traits, which were in between the range of present study (Table 5). Kemp et al. (1988) and Tosh et al. (1999) observed heritability of 0.19 and 0.15, respectively for BWT were lower than the present values.

The genetic correlation between bull MWT with progeny BWT was moderately high ($r_g=0.54$), but the correlations with FWT ($r_g=0.26$) and ADG ($r_g=0.28$) were low. The present value (0.28±0.23) of genetic correlation between ADG and MWT was lower than value of 0.37±1.24 estimated by Aktar et al. (2011), however, Hoque et al. (2005) showed extremely higher result (0.96±0.09) than in the present study. The estimated heritability for ADG (0.30±0.10) simply agreed to the value observed by Hoque et al. (2005) in Japanese Black bulls. Other corroborated values as 0.22 by Hirooka et al. (1996), 0.20±0·09 by Oikawa et al. (2000) for Japanese Black steers and 0.20 by Hoque et al. (2006) for Japanese Black young bulls supported the present results. Arthur et al. (2001) concluded that the ADG to be moderately heritable (0.20) which was slightly less than the present observation. Uchida et al. (2001) analyzed heritability for performance traits in Japanese Black steers and found the heritability of ADG to be 0.57, which is considerably higher than the present result.

The FI for bulls were moderately correlated with BWT (0.45±0.22), FWT (0.38±0.24) and ADG (0.35±0.25) of their progeny. Shojo et al. (2005) estimated the heritability for growth and feed utilization traits in Japanese Black cattle and ranged from 0.40 to 0.70 was visibly higher in the present study. Archer et al. (2002) established that FI and ADG for heifers and mature cows to be strongly correlated as $r_g=0.94$ and $r_g=0.72$, respectively. A negative genetic correlation ($r_g=-0.13\pm0.17$) was estimated between ADG and RFI (Table 6) that was in agreement with the figure of -0.10±0.18 as observed by Aktar et al. (2011). There was positive but very low correlation found between RFI, and BWT (0.06±0.18) vs. FWT (0.10±0.21) (Table 6). The correlation between RFI with BWT of the progeny was close to zero (0.06±0.18) and well comparable to the 0.08±0.22 established by Aktar et al. (2011). Hoque et al. (2005) established a correlation of bull RFI with body weights of their progeny were -0.33 at starting the test and -0.61 at finishing. Thus their conclusion was that a favorable negative genetic correlation between RFI and body weights of the progeny indicated the selection for lower RFI (higher feed efficiency) of bulls would lead to an increase in body weights of their progeny. The results by Korver et al. (1991) results for RFI with ADG and body weight were also close to zero and kept consistency with the present result.

Conclusion

Residual feed intake may serve as an appropriate selection tool for improving feed efficiency of breeding bulls without adversely affecting early growth performance of the progeny. Though residual feed intake of bulls is independent (zero correlation) with BWT, but weak and negative correlation with ADG of their progeny suggests that selection for reduced residual feed intake may result in improved animal efficiency without increasing cow size and it is possible to decrease residual feed intake of bulls without compromising progeny performance to improve herd production efficiency. Further in depth study with large number of animals is indeed for drawing authentic and sensible decision.

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