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Growth performance of Red Chittagong and Holstein crossbred bull calves using growth promoter

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Abstract

The aim of the study was to evaluate and compare the effect of growth promoter 'Megavit-DB' on growth performance of indigenous Red Chittagong (RC) and Holstein Crossbred (HC) bull calves. For this purpose, six RC and six HC bull calves were assigned into four treatment groups having three calves in each as RCT_0 (RC without Megavit-DB), RCT_1 (RC with Megavit-DB), HCT_0 (HC without Megavit-DB) and HCT_1 (HC with Megavit-DB). The daily DM intake of different treatment groups were found almost similar. The daily average live weight gains were 0.27±0.05, 0.36±0.01, 0.36±0.01 and 0.45±0.05 kg/d, feed conversion efficiency were 9.08±0.16, 7.47±1.07, 7.13±1.24 and 6.16±0.27 and the average net returns (Tk.) were 1473.33±87, 2060±76.38, 1910±86.60 and 2776.67±44.10 for RCT_0, RCT_1, HCT_0 and HCT_1 treatment groups, respectively. The daily average live weight gain and feed conversion efficiency were significantly ($p<0.05$) higher in HCT_1 than that from RCT_1, HCT_0 and RCT_0. Accordingly, the average net returns were found significantly ($p<0.05$) higher in HCT_1 than RCT_1, HCT_0 and RCT_0. It may be concluded that Megavit-DB may have the potentials to improve growth performance of both HC and RC and may be used in cattle fattening program.

Keywords: Growth performance, Red Chittagong, Holstein Crossbred**,** Megavit-DB

Introduction

There is a great scarcity of animal protein for human consumption in Bangladesh. There is no beef breed and therefore, to meet up the deficiency, small scale bull calves fattening program is essential. In this context there is evidence of profitable beef production with male calves obtained from dairy farm which was reported by Buaphun *et al.,* (2000). Furthermore, there are reasons to believe that the cost of dairy beef production can be further decreased through formulation of cheaper rations as well as improving calf management practices. Dairy beef production with appropriate economy of scale, through integrated farming approach utilizing crop by-products and wastes, with secured link to good quality beef market or cooperatives, can become a very viable enterprise in Southeast Asian countries in the coming decades. New products and technologies are continually introduced to beef producer. In general, most products or technologies require an increase in input with the expectation of an improvement in animal performance that will return an increase in cash flow above the cost of implementing the new technology. Growth promoters are those non-nutritive substances, which enhance the body weight gain of animal. Growth implants were first approved for beef cattle in the 1950 (Raun and Preston 1997). The use of growth-promoting implants in suckling beef calves increases average daily gain by 0.04 kg/day in steers and by 0.05 to 0.06 kg/day in heifers (Selk, 1997). However, it is important to use only products labeled for use in beef calves. The rice straw is the basal feed for ruminants, which is well known for its low digestibility and nutritive value. Thus, there is an urgent need for feed supplementation along with basal diet to get more benefit from beef cattle. Megavit-DB is a feed supplement marketed by Novartis Bangladesh Limited which contains vitamin, amino acid, calcium and other minerals. After deworming and antibiotic treatment, uses of Megavit-DB help in rapid growth of animals. Megavit-DB increases disease resistance and enhance fattening of bull calves. Considering the above facts, the present study was undertaken to compare the growth performance of Red Chittagong and Holstein Crossbred bull calves and calculate the cost-benefit of cattle fattening using growth promoter "Megavit-DB".

Materials and Methods

The experiment was carried out at the Dairy Farm, Bangladesh Agricultural University, Mymensingh for a period of 98 days. Twelve weaned, sound, healthy bull calves (six Red Chittagong and six Holstein Crossbred) of approximately similar age (1.5-1.6 yrs) and weight (106-117 kg) were selected from BAU Dairy Farm. All the bull calves were kept individually in the stall and fed individually. The house was well ventilated and the space per animal was adequate. Cleaning and hygienic management of the individual

pen was maintained regularly. Vaccination (BQ-vaccine, Anthrax spore vaccine, FMD-vaccine, and HS-vaccine) and deworming (Endex-1500 bolus) were done. After deworming the experimental animals were allowed for 15 days to adjust themselves with the experimental condition and diet. The animals were divided into four groups as RCT_0 (Red Chittagong without Megavit-DB), RCT_1 (Red Chittagong with Megavit-DB), HCT_0 (Holstein Crossbred without Megavit-DB), HCT_1 (Holstein Crossbred with Megavit-DB). Green grass was supplied *adlibitum* and 0.75 kg concentrate mixture was provided for all calves. Only the group RCT_1 and HCT_1 were supplied Megavit-DB (Novartis Bangladesh Limited) at a rate of 17 g/animal/d as an addition to the daily ration. The concentrate mixture was composed of Wheat bran (300 g/kg), Rice polish (300 g/kg), Sesame oil cake (100 g/kg) and Fish meal (50 g/kg). Common salt was supplied on the basis of 1kg/100kg concentrate mixture. The ration was formulated according to Agricultural Research Council (ARC 1990). The daily amount of roughages and concentrate for each animal were divided into two parts and supplied at 8.00 am and at 4.00 pm. Fresh drinking water was made available. The animals consumed all of the concentrate (0.75 kg/animal/d) but there were some leftover of green grass every day. The green grass intake was calculated by subtracting the amount of leftover from the amount of green grass supplied previous day. The initial body weight of each animal was recorded and the animals were weighed weekly by using weigh band and the weighing were carried out at the same time before morning feeding. The live weight gain was measured by subtracting the initial live weight from the final live weight. The rate of gain per day was calculated by dividing the total live weight gain by the number of total experimental days. Cost and returns of the experimental bull calves were calculated considering Initial cost, Feed cost (Green grass @ Tk.2/kg, Wheat bran @ Tk.16/kg, Sesame oil cake @ Tk.20/kg, Fish meal @ Tk.44/kg, Salt @ Tk.15/kg), Growth promoter cost (Megavit-DB) @ Tk.290/kg, Deworming cost @ Tk.15/tablet and Miscellaneous cost @ Tk.50/group. Return was calculated considering return from cow dung selling @ Tk.0.50/kg and return from bull selling based on BAU Dairy Farm auction price in the month of August-September, 2009. The data were analyzed statistically designed in Randomized Complete Block Design (RCBD) using the MSTAT statistical package program. One-way analysis of the variance was done by using statistical difference among the treatments. Duncan's Multiple Range test was also done to compare the treatment means (Gomez and Gomez, 1984).

Results and Discussion

Feed intake

The average daily total (green grass and concentrate) dry matter (DM) intake of different treatment groups of the experimental animals are shown in Table 1. It was observed that there were no significant (p>0.05) difference in daily DM intake among the treatment groups. These results are in agreement with the findings of Reed and Whisnant (2001) who found that monensin supplementation had no effect on feed intake. The effect of recombinant somatotropin, Synovex and their combination on DM intake was not significant (p>0.05) in intact male calves reported by Holzer *et al.* (1999). TengYun *et al.* (2001) reported that cysteamine had no stimulatory effect on feed intake. In contrast, WonMo *et al* (1998) reported that implanted growth promoters (zeranol 36 mg or progesterone 200 mg + estradiol benzoate 20 mg) at 8, 11 and 14 months of age in Hanwoo steers had significant effect on daily feed intake (kg/head). In another experiment, Rumsey *et al* (1999) found that DM intake for Synovex-implanted steers was higher (p<0.01) than control (9.2 vs 8.5 kg/day). The effects of feed intake of these findings are different from the present findings probably due to different type of growth promoters used, breed differences, environment and managemental differences.

Live weight gain

The mean for live weight gain and cumulative live weight gain in animals of different treatment groups are presented in Table 1. It is evident from the result that both total live weight gain and daily average live weight gains of RCT_1 was significantly (p<0.05) higher than that of RCT_0. Likewise, the bull calves of HCT_1 showed significantly (p<0.05) higher result than those of HCT_0. It is evident from the result that the animals belonged to group HCT_1 showed significantly (p<0.05) higher daily average live weight gains than that of RCT_1. The daily average live weight gain of the present study agrees with the findings of Salles *et al.,* (2000) who reported that addition of monensin (a growth promoter) significantly (p<0.05) improved

weight gain in Holstein bull calves. Rumsey *et al.* (1999) also found higher ($p<0.01$) live weight gain (38.7 kg) with growth promoter Synovex-S implanted steers than that of control. The daily average live weight gain of bull calves in the present experiment are in agreement with those of Lopez and Vazquez (1983) who found daily gains of 530 g in crossbred zebu steers implanted with 24 mg oestradiol-17beta. Similarly, Emery (1988) found that monensin sodium treated cattle grew from -0.03 kg to +0.7 kg per day faster than that of control.

Table 1. Intake and growth performance of bull calves of different treatments

Parameters	Treatments[#]				LSD	Level of Significance
	RCT_0	RCT_1	HCT_0	HCT_1		
No. of animals	3	3	3	3		
Total DM intake (kg/d)	2.44±0.15	2.69±0.06	2.56±0.11	2.79±0.06	0.52	NS
DM intake (kg/100kg LW)	2.28±0.01	2.53±0.02	2.24±0.01	2.38±0.03	0.28	NS
Initial live weight (kg)	106.33±8.37	107.33±6.98	117.00±2.65	114.33±9.24	23.96	NS
Final live weight (kg)	132.33±12.77	142.33±8.19	152.00±2.31	158.67±9.67	26.58	NS
Total live weight gain (kg)	26.05^{c}±4.58	35.17^{b}±1.20	35.21^{b}±0.58	44.16^{a}±5.24	8.55	*
Average live weight gain (kg/d)	0.27^{c}±0.05	0.36^{b}±0.01	0.36^{b}±0.01	0.45^{a}±0.05	0.08	*
Feed conversion efficiency (DMI/LWG)	9.08±0.16^{a}	7.47±1.07^{b}	7.13±1.24^{b}	6.16±0.27^{c}	0.98	*

[#]RCT_0 = Red Chittagong bull calves without Megavit-DB, RCT_1 = Red Chittagong bull calves with Megavit-DB, HCT_0 = Holstein Crossbred bull calves without Megavit-DB, HCT_1 = Holstein Crossbred bull calves with Megavit-DB, Values are Mean±SE, ^{abc}=Mean values having different superscripts in the same row differ significantly (p<0.05), NS=Non Significant, * indicates significant (p<0.05), LSD=Least Significant Difference, SE=Standard Error

Feed conversion efficiency

The feed conversion efficiency (DMI/LWG) of animals of different treatment groups are shown in Table 1. It was found that the animals belonged to HCT_1 showed significantly ($p<0.05$) higher feed conversion efficiency (Table 1) than that of HCT_0. However, significant ($p<0.05$) difference was also found between RCT_0 and RCT_1 and also between RCT_1 and HCT_1 (Table 1). The findings of the present study are comparable with the findings of Holzer *et al.* (1999) who found that the average feed conversion efficiency was significantly ($p<0.01$) increased by recombinant somatotropin treatment by 10% ($p<0.05$) in Holstein-Friesian bull calves. Similarly, Rausch *et al.* (2002) found that treatment with bovine somatotropin in growing beef cattle significantly ($p<0.05$) increased feed conversion efficiency. In another study, Siuta (1991) found that Cytozyme improved feed conversion efficiency of about 6% in Hereford steers.

Table 2. Cost and return of fattening of the experimental bull calves under different groups

Parameters	Treatments[#]				LSD	Level of Significance
	RCT_0	RCT_1	HCT_0	HCT_1		
Calf cost	10350.00±28.87	10300.00±28.87	10200.00±28.87	10083.33±44.10		
Feed cost	2000.00±0.00	2100.00±0.00	2000.00±0.00	2100.00±0.00		
Growth promoter cost	0.00	150.00±0.00	0.00	150.00±0.00		
Medication cost	40.00±0.00	40.00±0.00	40.00±0.00	40.00±0.00		
Miscellaneous cost	50.00±0.00	50.00±0.00	50.00±0.00	50.00±0.00		
Total cost	12440.00±28.87	12640.00±28.87	12290.00±28.87	12423.33±44.10	1.68	NS
Return from bull selling	13500.00±57.74	14200.00±57.74	13800.00±57.74	14700.00±57.74		
Return from cow dung	400.00±0.00	500.00±0.00	400.00±0.00	500.00±0.00		
Gross return	13900.00^{c}±57.74	14700.00^{b}±57.74	14200.00^{b}±57.74	15200.00^{a}±57.74	3.24	*
Net return	1473.33^{c}±87.62	2060·00^{b}±76.38	1910·00^{b}±86.60	2776.67^{a}±44.10	4.38	*

[#]RCT_0 = Red Chittagong bull calves without Megavit-DB, RCT_1 = Red Chittagong bull calves with Megavit-DB, HCT_0 = Holstein Crossbred bull calves without Megavit-DB, HCT_1 = Holstein Crossbred bull calves with Megavit-DB, Values are Mean±SE, ^{abc}=Mean values having different superscripts in the same row differ significantly (p<0.05), NS=Non Significant, * indicates significant (p<0.05), LSD=Least Significant Difference, SE=Standard Error

Economic analysis

The cost and returns of different treatment groups of bull calves are shown in Table 2. There was no differences among the treatment groups for cost but net return from HCT_1 was found to be significantly ($p<0.05$) higher than those of RCT_0, RCT_1 and HCT_0. Similar response was also reported by Hossain *et al.* (1996) who found that the average net income of each family was higher (Tk.7745.00/season) than untreated group.

Conclusion

It could be concluded from the present experiment that addition of Megavit-DB (l7g/animal/day) could increase the growth performance of both Holstein Crossbred and Red Chittagong bull calves.

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References

ARC (Agricultural Research Council). 1990. The Nutrient Requirements of Ruminant Livestock. 4th edn. *CAB International*, Wallingford, pp. 73-310.

Buaphun, S., Skunmun, P., Buathong N. and Chantalakhana, C. 2000. Cost and return in raising male calves from smallholder dairy farms for beef production. *Asian Australasian J. Anim. Sci.* 13 (10): 1461-1466.

Emery, A.C. (1988). Effect of monensin rumen delivery device as a growth promoter of young cattle at grass for finishing the subsequent winter. *Occasional Symposium*, *British Grassland Society*. 22: 264-266.

Gomez, K.A. and Gomez, A.A. 1984. *Statistical Procedures for Agricultural Research*. 2nd Edn. Jhon Wiley and Sons. New York, Chickester, Brisbane, Toronto, Singapore. 680.

Holzer, Z., Aharoni, Y., Brosh, A., Orlov, A., Veenhuizen, J.J. and Kasser, T.R. 1999. The effects of long term administration of recombinant bovine somatotropin (Posilac) and synovex on performance, plasma hormone, amino acid concentration, muscle and subcutaneous fat fatty acid composition in Holstein Friesian bull calves. *J. Anim. Sci.,* 77 (6): 1422-1430.

Hossain, K.M., Nahar, T.N., Talukder, A.I. and Kibria, S.S. 1996. Beef fattening by rural women. *In the proceeding of a National Workshop on case studies "Success stories of women in Agriculture".* 27-28 August, 1995, BARC, Dhaka, Bangladesh.

Lopez, L. and J. Vazquez 1983**.** Efficiency of oestradiol-17beta as a growth promoter for beef steers on pasture. *Veterinaria Tropical*. 1983, publ. 1984, 8: 71-81.

Raun, A.P. and Preston, R.L. 1997. History of hormonal modifier use. *In: Symposium: Impact of implants on performance and carcass value of beef cattle*. May 1997. Oklahoma Agricultural Experiment Station P-957: 1-9

Rausch, A.L.L, Tripp, M., Goveni, W., Zang, W., Weber, W.J., Crooker, B.A., Hoagland, T.A. and Zinn, S.A. 2002. The influence of level of feeding on growth and serum insulin like growth factor binding proteins in growing beef cattle supplemented with somatotropin. *J. Anim. Sci*. 80 (1): 94-100.

Reed, B.K. and Whisnant. C.S. 2001. Effects of monensin and forage: Concentrate ratio on feed intake, endocrine, and ovarian function in beef heifers. *Anim. Reprod. Sci.* 67 (3-4): 171-180.

Rumsey, T.S., Hammond, A.C. and Elsasser, T.H. 1999 a. Responses to an estrogenic growth promoter in beef steers fed varying nutritional regimes. *J. Anim. Sci*. 77 (11): 2865-2872.

Salles, M.S.V., Lucci-C-de-S and de-S-Lucci-C . 2000. Monensin for ruminant calves in rapid growth. 2. Digestibility and ruminal parameters. *RevistaBrasileira-deZootecnia*. 29 (2): 582-588.

Selk, G. 1997. Implants for suckling steer and heifer calves and potential replacement heifers. pp. 40-50. *In: Symposium: Impact of implants on performance and carcass value of beef cattle.* May 1997. Oklahoma Agricultural Experiment Station. P-957.

Siuta, A. 1991. Effectiveness of the activity of probiotic product "Cytozyme" in feeding young beef cattle. Part 2. *Evaluation of the usefulness of "Cytozym" in feeding of young beef cattle: Acts Agraria-et-Silvestria. Series Zootechnics*. 29: 135-145.

TengYun, G., YanLing, W., ZhengKang, H., XueFeng, Y., LaoQi, W., Gao, T.Y., Wang, Y.L., Ran, Z.K., Yang, X.F. and Wang, L.Q. 2001. Effects of cystearnme on liveweight gain, feed intake and serum hormone level in beef cattle. *J. Huazhong Agri.l Univ.* 20 (3): 259-261.

WonMo, C., SeongKoo, H., JongMoon, L., BongUyun P., ByoungDai, C., long, S.K., Lee, J.M., Pack, B.H. and Cho, B.D. 1998. Effects of growth promoter implants on feed efficiency and beef quality in Hanwoo (Korean native cattle) steers. *RDA J. Livestock Sci.* 40 (2): 9-14.