

EFFECT OF SAHIWALIZATION ON THE PERFORMANCE OF GRADED CATTLE AT A RURAL AREA IN BANGLADESH

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SUMMARY

Performance data on 136 cows covering 1987 to 1994 were analysed to see the effect of grading-up to Sahiwal at a rural area in Bangladesh. Birth weight, age at puberty, number of services per conception, post partum heat period, average daily milk yield, lactation production, lactation length, average fat and average SNF content of $\frac{1}{2}$ Sahiwal - $\frac{1}{2}$ PMC and $\frac{3}{4}$ Sahiwal - $\frac{1}{4}$ PMC were used. Effect of genotype was significant for all traits except number of services per conception and post partum heat period whereas sire effect was significant on birth weight, number of services per conception, lactation production and lactation length. For all dairy characters except average SNF, Grade 1 cows were superior than Grade 2 cows. Use of semen with higher sire proof and stabilization of Grade 1 cattle ($\frac{1}{2}$ Sahiwal - $\frac{1}{2}$ PMC) at this area were suggested.

Keywords : Graded cattle, Sahiwal, rural farming.

INTRODUCTION

Grading-up of indigenous cattle to established dairy breeds is being practiced in Bangladesh like other developing countries with poor intra-structure for animal breeding works. The Pabna Milking Cows (PMC), a variety of cattle at the greater Pabna district in Bangladesh was originated from the crossing of indigenous cattle (called Local) with Sahiwal, Hariana and Red Sindhi bulls since the beginning of this century from other parts of the sub-continent (Nasim, 1965, Ghosh, 1981). Considering the well adaptability of Sahiwal breed under tropical situations, the Bangladesh Milk Producers' Cooperative Union Limited (BMPCUL) commonly called 'Milk Vita' established in 1973, is carrying out an grading-up programme at Pabna area since 1987. Frozen Sahiwal semen of diversified origin is being used for further improvement of PMC cattle in order to boost up milk production. The objective of the study was to find out the effect of grading-up programme on the performance of cattle at the Baghabarighat, Pabna areas of BMPCUL in Bangladesh.

MATERIALS AND METHODS

Data were collected from the BMPCUL areas of Baghabarighat, Pabna. These records maintained through three primary milk producing societies were collected by Livestock

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Field Assistants-Insemination appointed by BMPCUL. The records covered nine production and reproduction traits of two genotypes viz. $\frac{1}{2}$ Sahiwal - $\frac{1}{2}$ PMC (Grade 1) and $\frac{3}{4}$ Sahiwal - $\frac{1}{4}$ PMC (Grade 2). Traits considered were : birth weight, age at puberty, number of services per conception, post partum heat period, average daily milk yield, lactation production, lactation length, average fat and average solids-not-fat (SNF) content. Data on a total of only 136 cows sired by frozen semen of five Sahiwal bulls which gave a total of 645 records in all traits from 1987 to 1994 were analysed.

Feeding and management system in the BMPCUL area were of two categories such as 'bathan' feeding (December to June) and stall feeding (July to November). 'Bathan' is a basin like area along a river of that area where large areas of grazing land (about 600 hectares) is available for seasonal legume production. During 'bathan' feeding all animals were kept in the field and managed by the cowboy and insemination, parturition and milking were carried out in the 'bathan'. During stall feeding, straw was the basal diet along with concentrate mixtures of rice polish, sesame oil cake, wheat bran and common salt which were given twice a day. Details about cattle production system at this area has been described elsewhere (Udo *et al.*, 1990).

A linear model with genotype and sire as main effects was used for the analysis of all traits by Harvey (1990). The means were compared using least significant difference test (Snedecor & Cochran, 1990).

RESULTS AND DISCUSSION

A summary of the effect of genotype & sire on the analysed traits are given in table 1.

Differences between Grade 1 and Grade 2 were significant ($P < 0.05$) for all traits except number of services per conception and post partum heat period (Table 2). Effect of sire on the birth weight of progeny, number of services per conception, lactation production and lactation length were significant ($P < 0.05$). Grade 1 was superior than Grade 2 in terms of dairy characters e.g. average daily milk yield, lactation production, lactation length and average SNF content. The remaining traits were better in Grade 2 than Grade 1. These results were similar to that reported by Islam (1995). The performances of Grade 1 cattle found in this study were higher than that of other Grade 1 cattle (between Local & Sahiwal) at other rural areas of Bangladesh (Husain & Mostafa, 1985; Nahar *et al.*, 1992). It could be due to differences in the genetic composition of Local and PMC cattle along with differences in management systems followed. The decline in dairy characters from Grade 1 to Grade 2 could according to Nicholas (1996) be due to that segregation during formation of gametes in half-bred gave rise to a spectrum of different types of gametes, ranging theoretically from a gamete containing only Local genes (e.g. PMC), to a gametes consisting solely of migrant genes (neglecting the effect of crossing over).

Table 1. Summary of the analysed traits at the BMPCUL area

Trait	N	Effect of	
		Genotype	Sire
Birth weight (kg)	61	*	**
Age at puberty (m)	100	**	NS
No. of services per conception (no.)	97	NS ¹	**
Post partum heat period (m)	47	NS	NS
Average daily milk yield (kg)	100	**	NS ²
Lactation production (kg)	60	***	*
Lactation length (d)	60	*	*
Average fat (%)	60	*	NS
Average SNF (%)	60	**	NS

1 $P < 0.06$, 2 $P < 0.07$

Table 2. Least squares mean (SE) performance of graded cattle at the BMPCUL area

Trait	Grade 1	Grade 2
Birth weight (kg)	21.43 (0.75)	23.19 (0.36)
Age at poultry (m)	38.53 (2.17)	31.12 (2.01)
No. of services per conception (no.)	1.45 (0.12)	1.23 (0.16)
Post partum heat period (m)	4.33 (0.72)	3.88 (0.55)
Average daily milk yield (kg)	8.37 (0.31)	7.49 (0.28)
Lactation production (kg)	2018.15 (183.80)	1235.19 (120.05)
Lactation length (d)	216.88 (17.90)	170.98 (11.69)
Average fat (%)	5.01 (0.07)	5.15 (0.04)
Average SNF (%)	7.94 (0.10)	7.63 (0.07)

Comparison of the sire effects indicate wide variation in their contribution. Among the sires, sire 2 surpassed others in all respect (Table 3). These variations indicate the opportunity to exercise rigorous selection pressure on the basis of their sire proof for use at the BMPCUL, Pabna area. However, inclusion of important environmental terms e.g. dam's age, lactation number etc. in the model could make the analyses more meaningful.

Since for all dairy characters except average fat content $\frac{1}{2}$ Sahiwal- $\frac{1}{2}$ PMC performed significantly better than that of $\frac{3}{4}$ Sahiwal- $\frac{1}{4}$ PMC, from the stand point of present study it seems reasonable to recommend to fix half-breds (Grade 1) at the BMPCUL, Pabna area in Bangladesh for more profitable milk production.

Table 3. The effect of sire [Mean (SE)] on the performance of progenies

Trait ¹	Sire				
	1	2	3	4	5
Birth weight (kg)	23.50 ^a (0.74)	23.77 ^{ab} (0.54)	22.91 ^{ab} (0.51)	23.19 ^{ab} (0.61)	18.22 ^{bc} (1.28)
No. of services per conception (no.)	1.14 ^a (0.14)	1.56 ^b (0.08)	1.10 ^a (0.12)	1.28 ^{ab} (0.16)	1.61 ^a (0.20)
Lactation production (kg)	1562.99 ^a (172.99)	2031.98 ^b (240.93)	1320.00 ^a (240.73)	1662.91 ^{ab} (241.28)	1591.48 ^a (427.02)
Lactation length (d)	197.90 ^a (16.84)	233.46 ^{ac} (12.01)	158.83 ^b (23.43)	185.52 ^{abd} (23.48)	193.95 ^{ab} (111.58)

¹with significant ($P < 0.05$) sire contribution only

Means with uncommon superscripts in the same row differ significant ($P < 0.05$)

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