Crossbred progeny production performance in rural areas of Western Maharashtra

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ABSTRACT

The network field progeny testing program sponsored by Indian Council of Agricultural Research (ICAR) is being operated in different parts of country and coordinated through Central Institute for Research on Cattle (CIRC), Meerut. Total 4,092 crossbred progeny (Holstein Friesian x Local) owned by 864 farmers spread over twenty six cattle breeding centres from Ahmednagar, Pune and Satara district of Western Maharashtra were reached to age at first calving (AFC) during the period of 20 years (1994 to 2013) and out of that 3,206 progeny completed their 1st lactation (2 died, 51 discontinued, 820 sold & 13 transferred). The performance of progeny was studied based on region (irrigated & unirrigated), participating units (BAIF, CIRC,GADVASU), sire dam's milk yield (4500, 4501-5500, 5501-6500, 6501-7500 & >7501 kg), season of calving (rainy-June to September, winter-October to January, summer-February to May), age at first calving (<649, 650-938, 939-1208, 1209-1478 & >1479 days) and progeny birth period (1994-97, 1998-01, 2002-05, 2006-09 & 2010-13). The 305 days milk yield was computed from the fortnightly milk yield records of alternate morning and evening milking. The first milk recording was got within fifteen days after calving and incomplete milk recording due to sale, transfer or death of progeny were excluded. The average first lactation 305 days milk yield of crossbred progeny under field conditions was recorded as 2974.95±12.03 kg and availability of irrigation facilities round the year, progeny calving season and birth period had significantly affected milk production levels of crossbred animals at field conditions.

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INTRODUCTION

As native cattle of Maharashtra state were very low in milk yield, exotic inheritance was introduced through massive crossbreeding programmes to enhance milk yield. This crossbreeding programme was very much flourished in Western Maharashtra compared to rest part of state due to factors like irrigation facilities, availability of green fodder, market for milk and net-work of cooperatives. The production performance of these crossbreed animals is affected by different factors like seasonal variations and management under field conditions. The performance of crossbred animals maintained at organized herds was evaluated and documented from time to time by various workers (Jadhav and Bhatnagar, 1984, Dalal et.al.,1991, Singh et.al.,2003, Avtar Singh,2005, Kumar et.al.2008), however, the information on performance of crossbreeds under field conditions is very limited especially from Maharashtra state. In this study the production performance of crossbred cattle maintained in farmers' herds participating in progeny testing programme of crossbred bulls taken up at BAIF Development Research Foundation, Urulikanchan is evaluated and the influence of different factors on the performance is investigated.

MATERIALS AND METHODS

The network field progeny testing program sponsored by Indian Council of Agricultural Research (ICAR) is being operated in different parts of country and coordinated through Central Institute for Research on Cattle (CIRC), Meerut. Along with CIRC, BAIF, Pune and Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana contributed the bulls for test inseminations and progeny born out of these sires formed the data for

present investigation. Total 4,092 crossbred progeny (Holstein Friesian x Local) owned by 864 farmers spread over twenty six cattle breeding centres from Ahmednagar, Pune and Satara district of Western Maharashtra were reached to age at first calving (AFC) during the period of 20 years (1994 to 2013) and out of that 3,206 progeny completed their 1st lactation (2 died, 51 discontinued, 820 sold & 13 transferred). These animals were individually maintained and reared by the farmers. The housing of animals ranged from semi-permanent to permanent constructed sheds. All animals were stall fed with dry and green fodder along with concentrates. The performance of progeny was studied based on region (irrigated & unirrigated), participating units (BAIF, CIRC,GADVASU), sire dam's milk yield (4500, 4501-5500, 5501-6500, 6501-7500 & >7501 kg), season of calving (rainy-June to September, winter-October to January, summer-February to May), age at first calving (<649, 650-938, 939-1208, 1209-1478 & >1479 days) and progeny birth period (1994-97, 1998-01, 2002-05, 2006-09 & 2010-13). The 305 days milk yield was computed from the fortnightly milk yield records of alternate morning and evening milking. The milk recoding was done for ten months by employing contract milk recorders and supervised by permanent employees. The first milk recording was got within fifteen days after calving. Incomplete milk recording due to sale, transfer or death of progeny were not included. The data was analyzed using 'R' software and statistical methods suggested by Snedecor and Cochran (1968) taking different factors under study as fixed effects.

RESULTS AND DISCUSSION

The results on the production performance of crossbred progeny based on different factors have been presented in Table 1. The average first lactation 305 days milk yield of crossbred progeny under field conditions was recorded as 2974.95±12.03 kg. The present estimate was more than the results (2955.78±26.76kg) obtained by Gokhale et.al.

Table 1. Production performance of crossbred progeny according to different factors.

#	Source of variation	Particulars	No. of Observations	1st lactation 305days milk yield (kg)	Percent observations
1	Region* *	Irrigated	1542	3120.55±16.45[a]	48.10
		Unirrigated	1664	2840.02±16.79[b]	51.90
2	Participating units	BAIF	2409	2982.06±14.55	75.14
		CIRC	443	2961.21±26.75	13.82
		GADVASU	354	2943.77±30.65	11.04
3	Sire dam's milk yield (kg)	4500	247	2916.64±49.52	7.70
		4501-5500	1349	2985.07±19.10	42.08
		5501-6500	932	2933.77±22.83	29.07
		6501-7500	468	3017.35±26.48	14.60
		>7501	210	3066.76±39.24	6.55
4	Calving Season* *	Rainy	938	3014.30±21.87[a]	29.26
		Summer	1345	2981.20±19.32[ab]	41.95
		Winter	923	2925.83±21.34[b]	28.79
5	Age at first calving (days)	<649	35	2919.62±68.84	1.09
		650-938	1013	2966.74±20.70	31.60
		939-1208	2083	2976.83±15.27	64.97
		1209-1478	63	3057.24±78.59	1.97
		>1479	12	3071.04±202.10	0.37
6	Progeny birth period* *	1994-97	600	2925.15±35.69[a]	18.71
		1998-01	872	2910.91±25.73[a]	27.20
		2002-05	450	2927.36±30.03[a]	14.04
		2006-09	697	3001.42±18.78[b]	21.74
		2010-13	587	3126.04±21.09[c]	18.31
Grand Total		3206		2974.95±12.03	100.00

Averages of similar superscripts in column did not differ from each other

(2007) and quite higher than the average (2677.56±22.12 kg) reported by Gokhale and Mangurkar (1995) for crossbred in Maharashtra. The average first lactation milk yield for crossbred cattle under Indian conditions were 3009.33±31.28 kg for Friesian × Hariana (Dalal et al.,1991), for Zebu × European cattle as 2486.24±80.26 kg (Singh et. al., 2003), for Friesian × Tharparkar as 3505.20±59.86 kg (Jadhav and Bhatnagar, 1984) and 2871.11±32.64 kg in Frieswal (Kumar et.al., 2008). The performance of progeny was evaluated on following aspects;

Region

The status of region (irrigated vs. unirrigated) exhibited significant effect on progeny production performance. Almost similar numbers of progeny were born in both regions and crossbreed animals from irrigated region recorded significantly higher production (3120.55±16.45kg) compared to those from unirrigated region (2840.02±16.79). The better performance in irrigated region was apparently attributed to availability of green fodder, supply of adequate ration and effluent condition of farmers resulting overall better management of animals.

Participating units

Under field progeny testing programme each bull batch comprised of bulls from BAIF Development Research Foundation (BAIF) UruliKanchan, Central Institute for Research on Cattle (CIRC), Meerut and Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana. Out of total progeny under study more than three forth (75.14%) progeny were born by BAIF sires semen and remaining were from CIRC and GADVASU bulls' semen. Although the progeny born out of BAIF sires' semen performed higher compared to progeny born out of sires used from other participating units the results were non-significant, which indicated non influence of bulls from progeny production point views.

Sire dam's milk yield

The technical programme envisaged testing of 30 Frieswal bulls in each batch having dam's mature equivalent (ME) milk yield of minimum 4500 kg or sons of progeny tested sires with index of 9000 kg or more without regard to dam's milk yield. During the study period total 186 bulls were put under test inseminations and they were divided into five groups depending on respective bull's dam milk yield. It was noticed that 71.15 per cent progeny were born from the sires having dam's milk yield ranging from 4501 to 6500 kg. In general it was observed that there was increase in progeny performance as sire dam's milk yield increased but it was not statistically significant.

Season of calving

Out of total 3,206 progeny under study, 41.95 per cent progeny were calved during summer season (February to May), 29.26 per cent in rainy season (June to September), and 28.79 per cent in winter season (October to January). The production performance of progeny calved in rainy season noticed to be significantly higher (3014.30±21.87 kg), followed by summer season calved progeny (2981.20±19.32 kg) and winter season calvers (2925.83±21.31 kg), whereas Sahana and Gurnani (2000) observed that animals calved during rainy season recorded significantly lower milk yield in (Friesian x Zebu) Karan Fries cattle maintained at National Dairy Research Institute, Karnal. The variation in performance of animals calved during different seasons may be attributed to availability of feeds and fodder and also the climatic factors in different seasons. Dubey and Singh (2005) and Kumar et. al. (2008) reported non-significant effect of season of calving on first lactation milk yield.

Age at first calving

Age at first calving is indication of overall management of animals and always efforts was done to achieve the optimum age so that life time production of animals could be achieved satisfactory. Under the present study 96.57 per cent progeny attained their first calving between 650 to1208 days from birth. It was noticed that late attainment of age at first calving helped to increase the production performance but it was not statistically significant and per cent progeny taking more days for reaching the first calving was also negligible. Rao et. al. (2000) also reported non-significant effect of age at first calving on first lactation milk yield in crossbred cattle under field conditions.

Progeny birth period

The progeny under study was born over a period of 20 years from 1994 to 2013 and this birth period was divided into five groups. It was noticed that period of progeny birth had significant effect on production performance and there was improvement over the period, which might be attributed to inclusion of bull batch having higher dam's milk yield, farmers overall awareness and culling of those animals not performing as per the expectation of farmers. Singh et. al. (2005) also noticed progeny birth period had significantly affected performance of Sahiwal x Holstein Friesian crossbred animals at organized farm.

The variability in the performance of crossbred animals under field conditions could be ascribed to differential availability of inputs, agro-ecological conditions, type of farmer and the indigenous and exotic breeds used in crossbreeding (Avtar Singh, 2005). Further the present study on different attributes associated to production performance of crossbred progeny showed that availability of irrigation facilities round the year, progeny calving season and birth period had significant effect on milk production levels of crossbred animals at field conditions.

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