Research paper

Crossbred progeny production performance under rural areas of Eastern Uttar Pradesh

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ABSTRACT

The field progeny-testing program of Holstein Friesian crossbred bulls sponsored by National Dairy Plan phase-I is operated in districts of Eastern Uttar Pradesh. The scheme was coordinated through National Dairy Development Board (NDDB), Anand, Gujarat, in India. Total 649 crossbred progeny (Holstein Friesian x Local) owned by 629 farmers spread over seventy cattle Development centres from Azamgarh, Gorakhpur, Jaunpur and Sultanpur district of Eastern Uttar Pradesh were reached to age at first calving (AFC) and completed their 1st lactation. The production performance of progeny was studied based on districts (4), sire (20), birth year (2), season of calving (3) and age at first calving (AFC) months (5 groups). The 305 days milk yield was computed from the monthly milk yield records of morning and evening milking. The first milk recording got within fifteen days after calving and incomplete milk recording due to sale, transfer or death of progeny were excluded from study. The average first lactation 305 days milk yield of crossbred progeny under field conditions of Eastern Uttar Pradesh was recorded as 2461.99±232.88 kg and it was significantly affected due to districts, birth year, calving season and AFC months at field conditions.

Keywords: Crossbred progeny, production performance, rural areas, Uttar Pradesh, NDP phase-I.
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INTRODUCTION

Genetically native cattle are very low in milk yield, hence to improve the milk yield in future generations exotic inheritance was introduced through massive crossbreeding programs in early seventies. This crossbreeding program was very much flourished in areas where factors like irrigation facilities, availability of green fodder, market for milk and network of cooperatives were available. The production performance of these crossbred animals affected by different factors like seasonal variations and individual farmer's 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, Shubha Lakshmi et.al. 2009), however, the information on performance of crossbred animals under field conditions is very much limited especially from Uttar Pradesh state. In this study the production performance of crossbred animals maintained in farmers' herd and participating in progeny testing program of crossbred bulls taken up at BAIF Development Research Foundation, Urulikanchan under National Dairy Plan (NDP) phase-I evaluated and presented.

MATERIALS AND METHODS

The field progeny-testing program of Holstein Friesian crossbred bulls operated under National Dairy Plan (NDP) phase-I in Uttar Pradesh during February 2014 to March 2019 and coordinated through National Dairy Development Board (NDDB) Anand, Gujarat, in India. BAIF, Pune contributed the bulls for test inseminations and progeny born out of these sires formed the data for present investigation.

Total 649 crossbred progeny (Holstein Friesian x Local) owned by 629 farmers spread over 70 Cattle Development Centers (CDC) from 4 districts namely Azamgarth, Gorakhpur, Jaunpur and Sultanpur of Eastern Uttar Pradesh were reached to age at first calving (AFC) and completed their 1st lactation production. 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 fodder especially rice leftover after crop harvest and available green fodder along with concentrates. The production performance of crossbred progeny was studied based on districts (4), sires used for test inseminations (20), progeny birth years (2), progeny calving seasons (3) and AFC month groups (5). The 305 days milk yield computed from the monthly milk yield records of whole day morning and evening milking recordings. The milk recoding was done for ten months by employing contract milk recorders and supervised by permanent employees. The first milk recording got within fifteen days post calving of animal. Incomplete milk recording due to sale, transfer or death of progeny were excluded from the study. For collecting the data from field animals' INAPH (Information Network for Animal Productivity and Health) software was used during project period. 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 least square means with standard error for first lactation 305 days milk yield of crossbred progeny based on different factors has been presented in Table-1. The average first lactation 305 days milk yield of crossbred progeny under field conditions of Eastern Uttar Pradesh was recorded as 2461.99±232.88 kg. The present estimate was noticed to be much less, compared with the results of various workers reported under Indian conditions as 2955.78±26.76 kg and 2974.95±12.03 kg for Friesian x local cattle in Maharashtra state Gokhale et.al. (2007) and Gokhale and Bhagat (2017), respectively, 3009.33±31.28 kg for Friesian x Hariana (Dalal et al.,1991), 3505.20±59.86 kg in Friesian x Tharparkar (Jadhav and Bhatnagar,1984), 2871.11±32.64 kg for Frieswal (Kumar et.al.,2008) and 2486.24±80.26 kg for Zebu x European cattle (Singh et.al.,2003). The production performance of crossbred animals under field conditions evaluated based on different aspects given below.

Effect of region/district

The district exhibited significant effect on crossbred progeny production performance. Highest number of progeny (30.82%) were born in Jaunpur district, followed by Gorakhpur (28.35%), Sultanpur (21.73%) and Azamgarh (19.11%) district. The crossbred animals from Jaunpur district recorded significantly higher production (2721.46±80.18 kg), followed by animals from Sultanpur district (2519.26±90.45 kg), Gorakhpur district (2318.17±82.45 kg) however, animals of Azamgarh district were lowest producer (2289.06±93.13 kg). The better performance of animals from Jaunpur district was apparently attributed to availability of green fodder, supply of adequate ration and effluent condition of farmers resulting overall better management of animals.

Effect of sire

Sire is the father of animal and it had non-significant effect on production performance of crossbred progeny under field conditions. Among the sires under study, the per cent of progeny born out of Humraj sire were highest (7.24), while lowest from Hethro sire (2.62). The production performance of progeny born out of Hanam sire was highest (2850.58±179.78 kg) and percentage of progeny born was 4.47 however, the progeny born out of Hitler sire were lowest (2193.65±181.58 kg) producer compared with progeny of other sires under study. The percentage of progeny born from Hitler sire was 4.31. Although, sire had non-significant effect on crossbred progeny production performance, superiority of progeny from some sires compared with others might be considered as genetic contribution from sire because the overall management of all the progeny born out of different sires had equivalent to all at farmers' doorstep throughout the project period.

Table1: Lease square means of 1st lactation 305 days milk yield of crossbred progeny.

Source of variation	Particulars	No. of Observations	1st lactation 305days milk yield (kg)	Percent observations
Districts	Azamgarh	124	2289.06±93.13a	19.11
	Gorakhpur	184	2318.17±82.45a	28.35
	Jaunpur	200	2721.46±80.18b	30.82
	Sultanpur	141	2519.26±90.45c	21.73
Sire	Haidos	43	2425.97±148.61	6.63
	Hanam	29	2850.58±179.78	4.47
	Handy	29	2553.80±178.31	4.47
	Haridatta	29	2580.28±181.57	4.47
	Harihar	38	2745.03±157.63	5.86
	Harjivan	27	2361.11±181.79	4.16
	Hebbal	38	2420.87±157.58	5.86
	Helium	34	2206.98±166.99	5.24
	Helmet	32	2473.17±168.64	4.93
	Herbal	35	2271.01±165.60	5.39
	Herculus	25	2503.62±190.40	3.85
	Hethro	17	2437.09±227.91	2.62
	Himanshu	27	2466.47±186.09	4.16
	Hirak	42	2638.31±149.04	6.47
	Hitler	28	2193.65±181.58	4.31
	Hon	32	2210.49±170.35	4.93
	Horizon	29	2590.36±177.21	4.47
	Humble	43	2301.97±149.85	6.63
	Humraj	47	2404.14±142.01	7.24
	Hungama	25	2404.86±191.89	3.85
Birth year	2015	516	2634.72±50.08a	79.51
	2016	133	2289.26±93.33b	20.49
Calving season	Rainy	209	2266.19±73.91a	32.20
	Summer	334	2465.29±63.90b	51.46
	Winter	106	2654.48±103.08c	16.33
AFC months	19-22	46	2673.06±142.80a	7.09
	23-26	169	2715.87±77.67a	26.04
	27-30	188	2531.08±75.19a	28.97
	31-34	156	2250.76±90.57b	24.04
	>35	90	2139.16±117.12bc	13.87
Overall	649	2461.99±232.88	100.00	

Least square means of different superscripts in column differ significantly from each other (p<0.01)

Effect of birth year

The progeny birth year exhibited significant effect on crossbred progeny production performance. These results are in agreement with the findings of Singh et.al. (2005) who noticed progeny birth period significantly affected performance of Sahiwal x Holstein Friesian crossbred animals at organized farm. More than 3/4th numbers of progeny (79.51) were born in the year 2015 and crossbred animals born during this year recorded significantly higher production performance (2634.72±50.08 kg) compared to those born during the year 2016 (2289.26±93.33 kg), however, the percentage of progeny born was 20.49. The better performance of progeny during the birth year 2015 was apparently attributed to better climatic conditions resulting overall better management of

animals at farmers' door- step.

Effect of season of calving

Out of total 649 progeny under study, 51.46 per cent progeny were calved during summer season (February to May), 32.20 per cent in rainy season (June to September) and 16.33 per cent in winter season (October to January). Season of calving significantly affected ($p \leq 0.01$) the production performance of crossbred animals. Winter season calved progeny outperformed (2654.48±103.08 kg) over summer (2465.29±63.90 kg) and rainy season calvers (2266.19±73.91 kg). The study results of Shubha Lakshmi et. al. (2009) corroborated the present results, who noticed that Friesian x Sahiwal cows at Secunderabad military farm calved during winter season recorded significantly higher milk yield. However, Sahana and Gurnani (2000) in Karan Fries (Friesian x Zebu) at National Dairy Research Institute, Karnal and Gokhale and Bhagat (2017) in Holstein Friesian x Local crossbred cows under Western Maharashtra conditions recorded animals calved during rainy season significantly higher milk yield. The variation in performance of animals calved during different seasons may be attributed to availability of better feeds and fodder and the conducive 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 of Sahiwal crossbred and Frieswal animals, respectively.

Effect of age at first calving

Age at first calving is indication of overall management of animals and always efforts were done to achieve the optimum age so that life-time production of animals could be achieved satisfactory. Under the present study 28.97 per cent progeny had attained their first calving between 27 to 30 months from their birth, followed by 26.04 per cent between 23 to 26 months, 24.04 per cent between 31 to 34 months and 13.87 per cent taken more than 35 months. Only 7.09 per cent progeny were early calvers (19 to 22 months). It was noticed that late attainment of age at first calving up to 26 months helped to significantly increase the production performance and there after steadily decrease noticed. Rao et. al. (2000) and Gokhale and Bhagat (2017) reported non-significant effect of age at first calving on first lactation milk yield in crossbred cattle under field conditions.

The variability in the performance of crossbred animals under field conditions of Eastern Uttar Pradesh 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). The present study based on different attributes associated to production performance of crossbred progeny showed district, birth year, calving season and age at first calving had significant effect on milk production performance of crossbred animals at field conditions. The study further indicated that late maturity of progeny above 26 months was not beneficial from production performance point of views under Eastern Uttar Pradesh condition, however in future a study based on large-scale data might help to highlight the issue expressively.

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