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RESEARCH **P**APER

Effect of level of Jersey inheritance on the length of dry period in cross bred cattle

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A study was conduct to estimate the effect of level of Jersey inheritance on the length of dry period in cross bred cattle. The data on dry period of Jersey (J) and Red Sindhi (RS) cows maintained at dairy farm, Sundersan School of Animal Husbandry and Dairying, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad (Deemed-to-be-University) were recorded form the history sheets of the animals maintained during this period (1930-1962) for the basis of this study. The data on dry period (DP) were recorded from history' sheets of 103 Jersey Sindhi crosses. Jersey Sindhi crosses were divided into 4 genetic-groups consisting of 17, 11, 51 and 24 animals in G_1 (1/2J x 1/2RS), G_2 (3/8 J x 5/8 RS), G_3 (1/4 J x 3/4RS), G_4 (1/8J x 7/8 RS). The effect of Jersey inheritance on dry period was recorded.The dry period of Jersey crosses pertaining to G_1, G_2 and G_3 and G_4 ranged from 50-81, 53-97 and 50-119 and 51-117 days, respectively. The mean dry period of Jersey crosses of genetic group G_1. G_2, $G_3$and G_4 were 64.76, 68.81, 73.54 and 78.83days, respectively.Genetic group of Jersey crosses had non- significant effect on the dry period of cows. Over the past few decades the investigations on determining the productive performance of cows have been in progress and considerable quantum of work has accumulated on this subject.This productive performance of cows is said to be influenced by number of environmental factor. If the any dairy animal having longer postpartum service period would have longer dry periods. New nutritional techniques, modern managemental and reproductive practices helps in shorten length of postpartum and it ultimately helps in decreasing the length of dry period.

Key words : Dry period, Cross bred, Jersey, Red Sindhi

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INTRODUCTION

India is a country with diversified agro-climatic condition and agriculture is the main occupation of over three fourth population of India. Crop husbandry and animal husbandry are dependent on each other in India, mainly because of small land holding by majority of farmers. Environment and heredity are important to cause phenotypic variations in quantitative traits of animals. Livestock production plays a important role in the rural economy of the developing countries like India. It is an accepted fact from Arias and even today that cattle are supposed as a wealth. India possesses largest bovine population in the world 190.90 million cattle and 108.7 million buffaloes (BAHS, 2012). Present scenario indicates that Indian agriculture is an economic symbiosis of crop and cattle production. It provides major source of income, as well as employment to millions of rural population. Dairy animals are independent on agriculture for supply of feeds. Dairying and agriculture both are

interlinked and hence, the dairying forms integral part of agriculture. Dairying has been an integral part of Indian culture since time immemorial. There is consensus that milk and milk product a meet the need of animal protein of high biological value and trace nutrients that play pivotal role in maintenance of health of human in mainly vegetarian country like that of ours. In the past, indigenous cattle breeds are considered as the "choice of animal'' for milk production. Besides the nutrition, breed and age of animals factors like dry period also influences the milk yield, fat yield and lactation length of cows (Prasad and Pereira, 1986; Prasad and Neeraj, 2007). Optimum dry period is essential to recoup cow's depleting resources due to milk production for over a long period.Tadesse, (2002) reported that cross breeding of these indigenous breed with high producing exotic cattle has been a very important method to increase the milk production.. Suhail *et al*. (2010) reported that the average dry period of Jersey cows was 169.26 ± 16.45 days, ranging between 22 to 465 days.Murdi and Tripathi (1990) reported average dry period in Jersey cows to be 93.8 ± 1.73 days. Many authors reported about the effect of season on the age of first calving and number of services at first conception (Swensson *et al.,* 1981; Haile-Mariam *et al*., 1993 and Belay and Chakravarty, 2013). Belay and Chakravarty (2013) also reported that cross breeding of Boran with HF or Jersey can improve reproductive performance. Nowicks and Press (1958) reported that the optimum dry-period for Friesian cows was 40 days and no advantage was derived by extending it beyond 50 days for maximum milk yield. Blat and Patro (1978) reported that the longer preceding dry period was not favourable for higher milk yield and lactation length.The heritability for dry period was found to be 0.1013 ± 0.2123 in Jersey cows (Suhail *et al.,* 2010), 0.092 ± 0.080 in Jersey cattle (Katoch *et al.,* 1990) and 0.08. (Deokar and Ulmek, 1997). Mitra and Chatterjee(1980) studied 91 records of Holstein x Haryana and Jarsey x Haryana crosses and reported non-significant of dry period on succeeding lactation peak in either of the crosses. Prasad and Pereira (1986) reported that wider dry period reduce economic return in exchange for feed, labour, etc. The length of service period was 168.13, lactation length 425.06 days, dry period 67.07 days for 468 crossbred cows of Sahiwal and Red Sindhi dams inseminated with Holstein, Brown swiss and Jersey semen.Tripathi and Prasad (2008) worked for performance of cows influenced by seasons of calving (summer, rainy, winter and spring) and order of lactation in 109 Brownswiss x Sindhi crosses maintained from 1926- '78 was determined from their history sheets at the Animal Husbandry Department of the Allahabad Agricultural Institute. Parameters of performance were lactation yield (LY), lactation length (LL), dry period (DP), days open (DO), service period (SP) and calving interval (CI). The lactation records were collected for eight lactations. It was found that both lactation order and the season of calving had no significant influence on LL, LY, DP, DO, SP and CI of Brownswiss crosses.

RESEARCH METHODOLOGY

The data on dry period of Jersey (J) and Red Sindhi (RS) cows maintained at dairy farm, Sundersan School of Animal Husbandry and Dairying, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad (Deemed-to-be-University) were recorded form the history sheets of the animals maintained during this period (1930-1962) for the basis of this study. The data on dry period (DP) were recorded from history' sheets of 103 Jersey Sindhi crosses. Jersey Sindhi crosses were divided into 4 genetic-groups consisting of 17, 11, 51 and 24 animals in G_1 (1/2J x 1/2RS), G_2 (3/8 J x 5/8 RS), G_3(1/4 J x 3/4RS), G_4(1/8J x 7/8RS). The effect of Jersey inheritance on dry period was recordrd. Following were the parameters for collection of data in this study.

Genetic group (G) :

G_1 (1/2 J x 1/2 RS), G_2 (3/8 J x 5/8 RS), G_3(1/4 J x 3/4 RS) and G_4 (1/8 J x 7/8 RS).

Dry period (DP) groups :

(1/2 J x 1/2 RS) - DP1 (50-60), DP2 (61-70) and DP3 (71-above).

Dry period (DP) groups :

(3/8 J x 5/8 RS) - DP1 (50-60), DP2 (61-70) and DP3 (71- above).

Dry period (DP) groups :

(1/4 J x 3/4 RS) - DP1 (50-60) DP2 (61-70) and DP3 (71- above).

Dry period (DP) groups :

(1/8 J x 7/8 RS) -DP1 (50-60), DP2 (61-70) and DP3 (71- above).

Table A : The structure of analysis of variance (ANOVA)

Source of variation	d.f.	S.S	M.S.S.	F value		Result
				F. Cal	Table at 5%	
Genetic groups	n-1	SSG	VT	VT/VE	-	S/NS
Error	N-n	SSE	Ve		-	
Total	N-1					

Statistical analysis :

The heritability of trait was estimated by paternal half sib correlation method. To find out the effect of Jersey inheritance on dry period. The data were subjected to statistical analysis using analysis of variance (ANOVA) technique (one way classification) as per method of Snedecor and Cochran (1994).

N= Total number of observation, N-1 total degrees of freedom, N= total number of genetic groups, n-1= degree of freedom for genetic groups, SS = sum of squares, SSG = Sum of squares due to genetic groups, SSE = sum of squares due to error, MSS = Mean sum of

Table 1 : Effect of genetic group (G_1) on dry period of Jersey crosses

G_1 (1/2 J X ½ RS)								Mean
76	68	52	50	74	51	61	81	64.767
78	55	63	74	79	52	69	52	

Table 2 : Effect of genetic group (G_2) on dry period of Jersey crosses

G_2 (3/8 J x 5/8 RS)									Mean
70	64	86	55	67	70	97	81	-	68.811
56	58	53	86	-	-	-	-	-	

Table 3 : Effect of genetic group (G_3) on dry period of Jersey crosses

G_3 (1/4 J x 3/4 RS)									Mean
74	61	64	58	95	57	115	94	58	73.540
76	66	105	63	116	85	55	51	66	
83	63	72	119	68	89	52	68	69	
50	70	56	57	71	78	53	61	59	
102	53	97	51	66	50	79	97	-	

Table 4 : Effect of genetic group (G_4) on dry period of Jersey crosses

G_4 (1/8 J x 7/8 RS)									Mean
110	112	58	68	96	51	86	115	64	78.833
83	67	69	57	61	91	61	88	88	
95	57	117	71	-	-	-	-	-	

Table 5 : Summary of performance of different genetic group of Jersey crosses on dry period

Groups	G_1 (1/2 J X ½ RS)	G_2 (3/8 J x 5/8 RS)	G_3 (1/4 J x 3/4 RS)	G_4 (1/8 J x 7/8 RS)
Mean dry period	64.76	68.81	73.54	78.83

Table 6 : Analysis of variance (ANOVA) for the data of dry period according to genetic group

Sr.No.	Sources of variation	d.f.	S.S.	M.S.S.	F.cal	F-tab P>0.05	Result
1.	Treatments	3	2174.193	724.737	2.318	2.68	NS
2.	Error	99	31048.659	313.627	-	-	
3.	Total	102	-	-	-	-	

NS= Non-significant

squares, VT = SST/n-1 VE = SSE/N-n, S = Significant, NS= Non- significant., C.D= critical difference,

$$C.D = \sqrt{VE\left(\frac{1}{n1}+\frac{1}{n2}\right)}$$

RESEARCH FINDINGS AND ANALYSIS

The data regarding genetic group wise dry-period of cows are presented in Table 1 to 5 and ANOVA of same is given in Table 6. Irrespective of genetic group the dry -period in cows ranged from 50-119 days.The dry period of Jersey crosses pertaining to G_1, G_2, G_3 and G_4 ranged from 50-81, 53-97, 50-119and 51-117 days, respectively. The mean dry period of Jersey crosses of genetic group G_1, G_2, G_3 and G_4 were 64.76, 68.81, 73.54 and 78.83 days, respectively. The differences in the dry-period of Jersey crosses due to genetic groups were non-significant (Table 2). From the perusal of data on dry period of Jersey crosses of different genetic groups are furnished in Table 1. Jhadav *et al.* (1991) reported that calving interval singnificantly influenced the dry- period in holstein Friesian (HF) x Sahiwal cross breeds. It was noted that in general dry-period of cows ranged from 50-119 days. However, the shortest mean dry-period was recorded in cows of G_1 (64.76 days) followed by 68.81 days in cows of G_2, 73.54 days in cows of G_3 and 78.83 days in cows of G_4. Since differences in these were found to be non-significant it indicated a non-significant effect of genetic groups on their dry-period. Deshpande and Deshpande (1992) reported in their research that no significant effect of season of calving on lactation length and dry period was found, in Jersey cow breed.

Conclusion :

Genetic group of Jersey crosses had non- significant effect on the dry period of cows. Over the past few decades the investigations on determining the productive performance of cows have been in progress and considerable quantum of work has accumulated on this subject. This productive performance of cows is said to be influenced by number of environmental factor. If the any dairy animal having longer postpartum service period would have longer dry periods. New nutritional techniques, modern managemental and reproductive practices helps in shorten length of postpartum and it ultimately helps in decreasing the length of dry period.

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