

FACTORS AFFECTING AGE AT MATURITY AND AGE AT FIRST CONCEPTION IN HOLSTEIN-FRIESIAN X SAHIWAL CROSSBREDS

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ABSTRACT

The data on 659 and 681 records of different crosses of Holstein-Friesian X Sahiwal crossbreds on age at maturity (first observed heat) and age at first conception, respectively were analyzed. The data was spread over 17 years from 1974 to 1990. The overall least squares means and SE for age at maturity and age at 1st conception were 618.42 ± 6.78 and 697.51 ± 8.03 days, respectively. The significant effect of year of birth and genetic groups was observed in both the traits while the effect of season of birth was non significant for age at 1st conception and significant for age at maturity. It was observed that ¾ crosses has significantly lower age for both the traits.

Keywords: Holstein-Friesian X Sahiwal cows, maturity age, conception, factors affecting

INTRODUCTION

The age at maturity and first conception are great economic importance. An early age at maturity and first conception would reduce the unproductive period and increase the lifetime milk production. Generation interval is also reduced thus progeny testing of bulls becomes feasible at an early age. In the present study an attempt has been made to investigate the factors affecting the age at maturity (first observed heat) and age at first conception in different grades of H. Friesian X Sahiwal crossbreds.

MATERIALS AND METHODS

The data on age at maturity (first observed heat) and age at first conception of 659 and 681 breeding records, respectively, of different crosses of Holstein-Friesian X Sahiwal crossbreds viz., 2 (F₁, F₂, F₃, F₄) 25, 37.5, 62.5 and 75 percent of exotic inheritance levels were used for this investigation. The data was collected from Livestock Production Research Institute, Bahadurnagar District Okara over a period of 17 years (1974-1990). The year was divided into four seasons viz., winter (November-January), spring (February-April), summer (May-July), autumn (August-October), based on geoclimatic conditions.

The data was analyzed by least squares analysis of variance technique by utilizing mixed model least square and maximum likelihood computer programme (Harvey, 1988). The effects of year of birth, season of birth and generic group on age at maturity and age at first conception were worked out by assuming the following model.

$$Y_{ijkl} = U + Y_i + S_j + G_k + E_{ijkl}$$

Where

- U = Overall population mean
- Y_i = Effect of ith year (i = 1, 2, ..., 17)
- S_j = Effect of jth season (j = 1, 2, 3, 4)
- G_k = Effect of kth genetic group (k = 1, 2, ..., 8)
- E_{ijkl} = Random error

Duncan Multiple Range Test was used for comparison of least square means.

RESULTS AND DISCUSSION

The least squares means and least squares analysis of variance for age at maturity and age at first conception are presented in Table 1 and 2. The overall least squares means for age at maturity (first observed heat) and age at first conception were 618.42 ± 6.78 and 697.51 ± 8.03 days, respectively.

Effect of year of birth

The effect of birth was highly significant (P < 0.01) for both the traits (Table 2). Punder (1995) reported similar results for these traits. The lowest age at maturity (417.05 ± 22.02 days) and first conception (476.60 ± 26.92 days) was observed for 1974 while the highest, age at maturity (758.79 ± 18.57) and age at first conception (836.10 ± 27.04 days) was observed for 1991 (Table 1). However, the least squares means for both the traits do not follow any consistent pattern during different years. This shows that the age at maturity and age at first conception could be reduced by proper feeding and management which ultimately results in reduction in age at first calving.

Table 1: Least squares means and standard errors for age at maturity and age at first conception in Holstein-Friesian X Sahiwal crossbreds

Effects	Age at maturity (days)		Age at 1 st conception (days)	
	No.	Mean ± SE	No.	Mean ± SE
U	659	618.42 ± 6.78	681	697.51 ± 8.03
YEARS				
1974	50	417.05 ± 2.02 a	50	476.60 ± 26.92 a
1975	71	543.90 ± 20.40 b	72	608.37 ± 24.79 b
1976	31	639.63 ± 24.56 bcd	35	735.51 ± 28.84 cd
1977	31	620.72 ± 26.61 b	37	753.10 ± 30.70 c
1978	25	582.25 ± 30.71 bcd	25	734.69 ± 37.36 de
1979	34	578.87 ± 21.51 b	33	688.83 ± 26.67 cd
1980	52	702.27 ± 17.71 f	56	768.80 ± 21.02 e
1981	55	758.79 ± 18.57 g	60	836.10 ± 27.04 e
1982	30	689.73 ± 22.82 ef	32	835.64 ± 22.19 e
1983	47	618.61 ± 19.09 bcd	47	678.36 ± 23.47 cd
1984	37	644.27 ± 21.03 de	37	660.24 ± 25.90 c
1985	45	640.70 ± 19.98 cde	45	677.90 ± 24.49 c
1986	52	621.50 ± 19.86 bcd	51	671.96 ± 24.72 c
1987	35	591.26 ± 22.08 bc	36	704.26 ± 26.94 cd
1988	32	645.89 ± 23.36 bcde	31	696.27 ± 29.08 cd
1989	22	616.87 ± 28.17 bcd	22	644.62 ± 34.75 bc
1990	10	600.72 ± 41.63 b	12	686.47 ± 47.02 bc
SEASONS				
Winter	258	622.37 ± 9.18 b	264	706.06 ± 11.02 a
Spring	167	596.40 ± 10.69 a	171	691.16 ± 12.94 a
Summer	127	639.62 ± 11.73 a	133	714.63 ± 14.24 a
Autumn	107	615.31 ± 12.34 ab	113	678.20 ± 14.72 a
GENETIC GROUP				
½ F1 (HxS)	218	648.64 ± 13.63 b	228	696.47 ± 16.41 ab
½ F2 (HxS)	160	646.42 ± 11.32 c	161	725.34 ± 13.80 c
½ F3 (HxS)	111	608.99 ± 14.76 b	111	714.30 ± 19.19 b
½ F4 (HxS)	32	575.49 ± 24.76 ab	34	630.42 ± 29.76 a
¾ (HxS)	41	521.19 ± 24.19 a	46	597.00 ± 28.84 ab
5/8 (HxS)	50	647.56 ± 18.30 c	50	722.27 ± 22.52 c
3/8 (HxS)	17	666.16 ± 30.16 c	20	737.02 ± 34.33 c
¼ (HxS)	30	632.94 ± 30.06 ab	31	757.27 ± 35.78 c

Means bearing similar superscripts do not differ significantly among themselves.

Table 2: Least squares analysis for variance for age at maturity and age at first conception in different crosses of Holstein-Friesian X Sahiwal crossbreds

S.O.V.	Age at maturity		Age at 1 st conception	
	df	M.S	df	M.S
Years of birth	16	217151.15**	16	284995.41**
Season of birth	03	41616*	03	32226.29 N.S
Genetic group	07	69546**	07	84576.56**
Remainder	632	13606.58	654	20799.32

d.f. = degree of freedom; M.S. = Mean Squares; ** = Significant at P<0.01; * = Significant at P<0.05.

Effect of season of birth

The effect of season of birth was significant (P<0.05) on age at maturity whereas non-significant effect was observed on age at first conception (Table 2).

The findings are in agreement with the results of Ulmek *et al.* (1992). They reported non-significant effect of season of birth on age at first conception. The female calves, born during the spring season have

significantly lower (596.40 ± 10.69 days) age at maturity than other season which may be due to better weather, fodder and managerial practices.

Effect of genetic groups

The effect of genetic groups on both the traits was highly significant ($P < 0.01$). These findings were in consonance with the findings of Chaudhry *et al.* (1987), Dash and Mishra (1980), Athar (1980) who reported a significant effect of genetic groups on age at maturity. However, Chaudhry and Manzoor (1994) reported a non-significant effect due to genetic groups on age at maturity and age at first conception in Holstein-friesian X Sahiwal crossbreds reared under optimum feeding and managerial conditions.

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