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To assess the effect of dry period on the subsequent production and reproduction performance of Holdeo (Holstein Friesian x Deoni) interse

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Abstract
The present study was undertaken to evaluate the effect of dry period on the subsequent production and reproduction performance in Holdeo (HF x Deoni). The data representing HF X Deoniinterse cattle from Cattle Cross Breeding Project, VNMKV, Parbhani with 960 total records of lactation over a 25 years period (1991-2015) were analyzed to determine the effect of period of calving and season of calving on production and reproduction performance of Holdeo. The overall least squares means were DP (124.83±5.76 days), DP was significantly affected by period of calving (p<0.01) in Holdeointerse cows. However, season of calving had non-significant effect on DP.

Keywords: Holdeo, dry period, production and reproduction performance

Introduction
Indian dairying is an emerging industry, so to make it profitable and sustainable we should have not only produce high producer animals but also develop an economic and profitable production system. Overall, economic return from individual animals depends upon various productive and reproductive performance besides milk production. The decade-wise rate of growth in milk production in India (4.00 per cent) is substantially higher than the world average of 1.50 per cent. Despite of holding the number one position in milk production in the world for over a decade, the milk productivity in the country remains one of the lowest as compared to the many leading countries of the world border areas of Andhra Pradesh and Karnataka state. In India, crossbreeding of Zebu cattle with exotic germplasm is considered as a national policy, both on the organized farm as well as in field condition. Crossbreeding of Indian cows with exotic dairy breeds has been started in our country under cattle developing programme from 3rd five-year plan. Crossbreeding programme in India has made significant impact on milk production in the country. The greatest advantage of crossbreeding is attributed to faster growth rate eventually leading better reproduction and production. Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani has taken a project for improvement of Deoni cattle by crossbreeding with elite exotic breed Holstein Friesian. The crossbred is named as Holdeo. Deoni is one of the important dual purpose cattle breed of Marathwada region of Maharashtra state and adjoining areas of Maharashtra i.e. Andhra Pradesh and Karnataka states.

Materials and Methods
Data representing HF × Deoniinterse cattle from CCBP with 960 total records of lactation over a 25 years period (1991-2015) were analyzed to determine the effect of period of calving and season of calving on production and reproduction performance of holdeo cattle. The complete years was divided into 3 seasons and 5 periods having 5 years each. The three seasons namely winter (October-January), summer (February-May) and monsoon (June-September) were coded as S_1, S_2 and S_3. The period of calving was coded as P_1 (1991-1995), P_2 (1996-2000), P_3 (2001-2005), P_4 (2006-2010) and P_5 (2011-2015). The data were statistically analysed for linear model (SAS, 2002). Duncan Multiple Range Test (DMRT) was employed to test and locate means that significantly differed from each other (Kramar, 1957).
The following statistical model was employed to analyse the data
$y_{ijk} = \mu + S_i + P_j + e_{ijk}$
y_{ijk}- Observation for $_i^{th}$ season and $_j^{th}$ period of calving

μ-The overall mean
S_i-The effect of $_i^{th}$ season of calving
P_j- The effect of $_j^{th}$ period of calving
e_{ijk}- Random error associated with NID (6^2e)

Dry period (DP)

The least squares means of DP and analysis of variance showing effects of period of calving and season of calving on dry period in Holdeo cows are presented in Tables 1 and 2. The overall least squares means for DP of Holdeo cows was 124.83±5.76 days. The results were close to Singh *et al.* (1980) [9] in Friesin x Local, Jersey x Local and other crosses, Jadhav *et al.* (1991) [4] in HF x Sahiwal, Dubey and Singh (2005) [3] in Jersey x Sahiwal. The effect of period of calving on DP was significant (p<0.01) in Holdeo cows (Table 2). The mean DP (days) was higher in period P_5 (147.57±13.90) followed by P_2 (139.44±12.67), P_3 (129.88±11.68), P_1 (108.31±9.95) and lowest in P4 (98.94±11.67). These results were supported with the findings of Bonde *et al.* (1983) [2] in HF x Deoni crossbred cattle and Jadhav *et al.* (1991) [4] in HF x Sahiwal. The variation due to season of calving in DP was non-significant (Table 2). The LSM of DP (days) was higher in cows calved during S_3 (129.05±9.95) followed by S_1 (128.03±9.44) and lowest in S_2 (117.40±8.67). The present results indicated that in particular season of calving the DP in Holdeointerse crossbred was not deviated and showed the slightly differences among the seasons. More or less similar results were reported by Tivari *et al.* (1995) in Jersey x Sahiwal crossbred, Holstein Friesian x Sahiwal crossbred, Komatwar (2010) [5] in Holstein Friesian x Deoni crossbred cow and Bhutkar *et al.* (2015) [1] in Holstein Friesian x Deoni crossbred cattle.

Table 1: Dry period in Holdeointerse

Source	Code	N	LSM±SE
Mean	μ	730	124.83±5.76
Period of calving	P_1	211	108.31^{b}±9.95
	P_2	124	$139.44^{a\pm}$12.67
	P_3	144	129.88±11.68
	P_4	147	98.94^{b}±11.68
	P_5	104	$147.57^{a\pm}$13.90
Season of calving	S_1	232	128.03±9.44
	S_2	292	117.40±8.67
	S_3	206	129.05±9.95

Table 2: Analysis of variance for DP

Source	DF	SS	MSS	F value calculated
Period of calving	4	230647.08	57661.77	3.01^{**}
Season of calving	2	21244.83	10622.41	0.56^{NS}

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