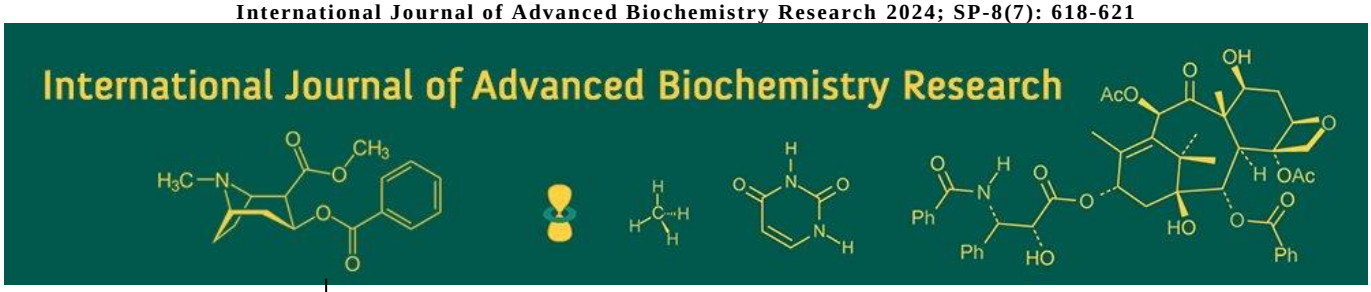

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Improved the productive and reproductive traits in Hariana cows

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Abstract
The present study was carried out during 2018-19 Department of Animal Husbandry and dairying, Raja Balwant Singh College, Bichpuri, Agra, on the Haryana cows which raised and maintained at Pandit Deen Dayal Veterinary University, Mathura (U.P.). The Veterinary University farm which the data were obtained for this investigation is situated in plain of U.P., 174 metres about the sea level and average rainfall in this part is about 60 cm. so that having dry climate of Northern India. The study focuses on the reproductive and productive traits of Haryana cows, a breed of indigenous cattle. Key parameters such as age at First calving, First calving interval, First lactation period, and First dry period were analyzed over a period of 30 years from 1981 to 2010. The data were categorized into six periods of five years each and four seasons (S_1 January-March, S_2 April-June, S_3 July-September and S_4 October-December) of four months each. Results indicate variations in these traits over time and seasons, with implications for dairy farming and management practices. The study underscores the importance of these traits in optimizing dairy production and highlights the need for sustainable breeding and management strategies for indigenous cattle breeds like the Haryana cow.

Keywords: Productive, reproductive traits, Hariana cows

Introduction
Cattle play pivotal role in animal husbandry sector of India with the population of 185 millions heads which includes 160 million indigenous cattle population (Livestock and Poultry Census, 2003) [24] distributed throughout the country and providing livelihood sustenance to millions of rural habitats. Indigenous cattle wealth, which contribute about 87 per cent of total cattle population is endowed with 30 recognized breeds of cattle spread over various states across the length and breadth of the country. Each breed has its own characteristic features, whether specific for milk production, draught power or both, having evolved over generations by natural selection and needs of the people to fulfill their specific local demands. Thus, these breeds become well adapted with local agro climatic conditions and merged deeply in social, cultural and economical facets of human society.

The native breeding tract of Hariana cattle lies between 28°30' and 300 north latitude and 75° 45' and 76° 80 east longitude. The native breeding tract of Hariana cattle encompasses large part of Rohtak, Hisar and Gurgaon districts of Hariana cattle. Purebred Hariana cattle were abundant in Jhajjar, Beri and Jahajgarh pockets of Rohtak district and the region was a leading trading centre particularly for Hariana bullocks. Besides the distribution of Hariana cattle in its traditional breeding tract and other adjoining areas, these animals were reared in the erstwhile princely States of Nabha, Patiala, Jaipur, Jodhpur, Alwar, Loharu and Bharatpur. Meerut, Bulandshahar and Aligarh districts of Western Uttar Pradesh also had sizable, population of this breed. Till recent time the Hariana bullocks were considered a prized possession due to their outstanding draft ability. The milking qualities of cows received belated attention. This breed has also proven over the as good milk yielder. However, changes in agricultural scenario have made the Hariana cattle like many other indigenous cattle breeds uneconomical.

The large cattle herds mainly grazed on the common pasture lands of the village. However, as the pasture land progressively shrunk, the traditional and perhaps the cheapest mode of rearing large cattle population received a grave set back. The diversion of grazing lands into

intensive agriculture and changes in the cropping pattern are meteoric in this region. These changes obviously heralded green revolution in this area but affected traditional livestock husbandry. A recent random sample survey conducted in districts of Rohtak, Sonepat and Bhiwani further reinforced the earlier belief on the fast changing cattle population in the area.

Materials and Methods

The present study was carried out on the Haryana cows which raised and maintained at Pandit Deen Dayal Veterinary University, Mathura (U.P.). The Veterinary University farm which the data were obtained for this investigation is situated in plain of U.P., 174 metres about the sea level and average rainfall in this part is about 60 cm. so that having dry climate of Northern India. Management of Haryana cows of various stages of their life cycle on the farm is carried out on the scientific lines. The calves from birth to 6 month of age, young stock farm 6 months upto 2 years, heifers, pregnant, lactating and dry cows are housed and cared separately in groups and methods of breeding is followed by natural services. The management of the farm is standardized their record keeping is precise and honest and is also based on the periodical evaluation. The nutrition requirements are met through both roughage and concentrates. Calves are weaned at birth to 6 months age Animal are milked by hand at the farm. The concentrate mixture consisted of groundnut cake, mustard cake, cotton seed cake, wheat bran, barley grain and mineral mixture as the essential ingredients. The other locally available ingredients such as wheat, cluster been, black gram, rice husk and maize are also added. The proportion of carbohydrates. Protein and total digestible nutrient (T.D.N.) are balanced according to the nutritional standards. For the present investigation the following information were collected on the adult females. 1. Age of first calving (days), 2. First calving interval (days), 3. First lactation milking yield (Litres), 4. First lactation period (days) and 5. First dry period (days). The data were spread over 30 years from 1981 to 2010. The data of 30 years were grouped in to 6 periods each with duration of 5 years based on first calving. Thus P_1 1981-1985, P_2 1986-1990, P_3 1991-1995, P_4 1996-2000, P_5 2001-2005 and P_6 2006-2010. The seasons were grouped in to 4 seasons each with a duration of 4 months based on first calving. The Months S_1 January-March, S_2 April-June, S_3 July-September and S_4 October-December.

Results and Discussion

Reproductive traits

Age at first calving has immense economic importance for successful dairy farming in dairy animals ensures smaller investment and quicker returns of the capital involved. Genetically it reduces the generation interval resulting in larger annual genetic gain from selection. The means and standard error for age at first calving in the Hariana cows have been given in Table-1, analysis of variances have been presented. Age at first calving for Hariana cows in present investigation has been observed to be 1488.4±71.2 days. The present investigation in close agreement with those reported by Singh, (1970) [16], Dhoke *et al*. (1974) [8] and Arora *et al*. (1981) [1] for Hariana cows.

The period P_6 (2006-2010) indicated the lower value of age at first calving in comparison to the P_1 (1981-1985), P_2 (1986-1990), P_3 (1991-1995) and P_4. (1996-2000), P_5 (2001-2005). The lower value of age first calving reported by Singh (1970) [16], Balaine (1971) [2], Arora *et al*. (1981) [1], Singh *et al*. (1982) [19], and Yadav and Balaini (1984) [23] for Hariana cows. The effect of season on age at first calving was non-significant at 5% levels, season S_1, S_2 and S_3 have also indicated the highest value for age at first calving in comparison to S_4 in Hariana cows. The present findings are in conformity with the observation by Soof *et al*. (1970) [20], Tomar and Singh (1981) [21], Singh *et al*. (1982) [19] reported significant effect of season on age at first calving in Hariana cows. First intercalving period has immense economic importance for successful dairy farming in dairy animals ensures smaller investment and quicker returns of the capital involved. Genetically it reduces the generation interval resulting in large annual-genetic gain from selection. The mean and standard error for first intercalving period have been detailed in Table-1, analysis of variance have been presented in Table-1. The overall mean (u) at first inter calving period for Hariana cows in the present investigation have been observed to be 619.7±7.45 days. However, higher estimates for first inter calving period have been reported by Singh *et al*. (1966) [15] in Hariana cows.

Table 1: Mean and Standard error for Age at first calving (days) in Haryana cows

Classification	No. of Observation	Age at first calving (days)	Standard error	First calving interval (days)	Standard error
Overall Mean (U) Periods	113	1488.4	71.2	619.70	7.45
P_1 (1981-1985)	2	1471.5	227.5	624.60	23.82
P_2 (1986-1990)	3	1496.7	180.1	593-80	18.86
P_3 (1991-1995)	11	1461.8	111.9	619.70	11.71
P_4 (1996-2000)	9	1610.6	121.2	628.80	12.69
P_5 (2001-2005)	55	1484.9	69.6	620.90	7.29
P_6 (2006-2010)	33	1403.6	81.7	630.10	8.55
Season					
S_1 (Jan. - March)	20	1561.7	84.2	629.10	8.82
S_2 (April- June)	54	1581	62.6	619.90	6.55
S_3 (July- Sept.)	37	1533.7	70.6	606.40	7.40
S_4 (Oct.-Dec.)	2	1277	232.5	623.33	24.34

The period effect on the first inter calving period was non-significant in Hariana cows. This indicated the lower calving interval of Hariana cows observed during the P_2 (1986-1990). In comparison to P_1 (1981-1985), P_3 (1991-1995), P_4 (1996-2000), P_5 (2001-2005) and P_6 (2006-2010) in Hariana cows. The lower value of first calving interval reported by Bhasin (1967) [4]. Dadlani and Chandriramani (1968) [6] and Mathur *et al*. (1997) [10] for Hariana COWS. The effect of season on first calving interval was significant at 5% level. S3 (July Sept.) and S2 (April-June) have also

indicate the lower value for calving interval in comparison to season S_1 (Jan. - March) and S_1 (Oct. - Dec.) in Hariana cows. The present finding in conformity with the observation by Singh *et al*. (1968) [14]. Tomar and Singh (1981) [21] and Singh *et al*. (1982) [19] reported significant effect of season on first calving interval in Hariana cows.

Productive traits

The mean along with standard error for first lactation period in Hariana cows have been given in Table 2, analysis of variance have been presented in Table 2. The average lactation period for Hariana cows in the presented investigation observed to be 295.7±14.19 days. The present investigation for first lactation period was reported by Singh (1959) [17] and Chandrimani *et al*. (1967) [5] for some Zebu and Hariana cows. The highest value was reported by Singh and Desai (1959) [17], for Hariana cows and the lower value was reported by Johari and Tylor (1973) [3] for Hariana cows. The effect due to periods of the first lactation period was significant for Hariana cows by the present investigation. Period P_2 (1986-1990) shows the highest value of first lactation period 360.0±35.89 than the other periods and the highest lactation period reported by Singh and Desai (1969) [17], Johari and Tylor (1973) [3] and Patel *et al*. (1987) [11] for Zebu and Hariana cows. Season S_1 (Jan.-March) and S_2 (April-June) shows the highest value than the other seasons and lower value was reported. It was generally expected that there would have been on overall improvement in first lactation period due to introduction of advanced animal husbandry practices and good management practices. The Hariana cows do not produce for about one third of their inter calving period during which they have to be feed and looked after leading to high cost of milk production. In view of low milk yield in the same or subsequent lactation the dry period is not expected to improve through selection. The mean along with standard error for dry period in Hariana cows have been given Table-2.

Table 2: Mean and Standard error for first lactation period (days) in Haryana cows

Classification	No. of Observation	First lactation period (days)	Standard error	First dry period (days)	Standard error	First lactation milk yield (litre)	Standard error
Overall Mean (U) Periods	113	255.7	7.45	301.0	17.56	922.80	89.42
P_1 (1981-1985)	2	209.1	23.82	255.80	56.12	629.70	285.74
P_2 (1981-1985)	3	360.0	18.86	393.80	44.43	480.20	226.22
P_3 (1981-1985)	11	287.30	11.71	246.70	27.60	834.20	140.51
P_4 (1981-1985)	9	294.30	12.69	328.50	29.89	997.80	152.22
P_5 (1981-1985)	55	321.50	7.29	296.90	17.18	1164.0	87.48
P_6 (1981-1985)	33	302.10	8.55	284.20	20.15	1431.0	102.59
Season							
S_1 (Jan. - March)	20	309.80	16.78	323.30	20.78	866.50	105.79
S_2 (April- June)	54	209.50	12.47	316.90	15.44	796.50	78.62
S_3 (July- Sept.)	37	309.20	14.08	309.50	17.42	776.60	88.72
S_4 (Oct.-Dec.)	2	257.40	46.32	254.10	57.34	1251.70	291.95

The average dry period for Hariana cows in the present investigation observed to be 301.0±17.56 days. The effect due to periods was significant on first dry period. The period P_3 (1991-1995) lower value of observed dry period in Hariana cows. The lower value reported by Mathur *et al*. (1997) [10] and Pundir (1999) [12]. Season of calving also had non-significant at 5% levels on the first dry period of Hariana cows. Balaine and Aggrawal (1973) [3] and Tomar and Balaine (1973) [22] reported significant differences in dry period.

The effect due to period was also significant on the first lactation milk yield in Hariana cows. The period P_2 (1986-1990) shows the lower value then the other periods. The lower lactation milk yield is reported by Singh and Desai (1961) [18] and Balaine and Singh (1971) [2] for Hariana cows. The effect due to season was non-significant on the first lactation milk yield at 5% level in Hariana cows by the present investigation reported by Balaine (1971) [2] and Das and Balaine (1980) [22]. The season S_4 (October to December) shows the highest value of first lactation milk yield than other seasons in Hariana cows. The higher value reported by Dadlani and Chandiramani (1968) [6], Dadlani *et al*. (1969) [7] for some indigenous and Hariana cows.

The mean and standard error of first lactation milk yield have been detailed in Table 2 analysis of variance have been given in Table-2 in Hariana cows. The overall mean of first lactation milk yield was 922.8±89.42 liters in Hariana cows. The milk production is the end result of a long chain of event caused by numerous and complex physiological process. The present investigation result of milk yield of first calving for Hariana cows closely related by Soof *et al*. (1970) [20] and Sharma *et al*. 1980 [13] for Hariana cows.

Conclusion

The findings of this study shed light on the reproductive and productive traits of Haryana cows over a period of three decades. It is evident that age at first calving, first calving interval, lactation period, and dry period are influenced by both temporal and seasonal factors. The observed variations underscore the importance of careful management practices and breeding strategies to optimize dairy production in Haryana cows. Furthermore, the study highlights the need for continued research and monitoring to adapt to changing agricultural landscapes and to ensure the sustainability of indigenous cattle breeds in the face of evolving agricultural practices. By understanding and addressing the factors affecting these traits, stakeholders in the dairy industry can work towards enhancing the productivity and welfare of Haryana cows, thereby contributing to the overall development of the animal husbandry sector.

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