Indian Journal of Animal Sciences **81** (7): 708–710, July 2011

Evaluation of Sahiwal cattle for lifetime traits in an organized herd

UMESH SINGH[1], ARUN KUMAR[2], SUSHIL KUMAR[3] and B K BENIWAL[4]

Project Directorate on Cattle, Meerut Cantt, Uttar Pradesh 250 001 India

Received: 12 January 2011; Accepted: 8 February 2011

ABSTRACT

The present study was undertaken on 752 lactation records of 190 Sahiwal cows maintained at Government Sahiwal Cattle Breeding Farm, Chakganjaria, Lucknow, over 17 years (1983–1999) to evaluate the performance of lifetime traits. The traits were considered for study as herd life (longevity), productive herd life**,** life time calf production**,** life time milk yield**,** and total lactation length**,** age at first service and age at first calving traits. The average herd life (longevity) and productive herd life (PHL) were 3199.39±100.48 days and 1872.28±100.28 days, respectively. The herd life and productive life were significantly influenced by period of birth whereas season of birth had no significant effect. The cows born in the first period (1983–87) had longest herd life (3449.25±166.43 days) and PHL (2093.02±166.11 days), however, shortest herd life (2923.59±200.79 days) and productive herd life (1585.80±200.41 days) were observed in the third period (1994–99). The average number of total calves produced by each cow during its life time was 4.19±0.20. It was significantly affected by period of birth whereas season of birth had no effect. The highest number of total calves born was observed in winter season (4.45) and first period of birth (4.55). However, it was lowest in rainy season (3.95) and third period of birth (3.71). The average age at first service and age at first calving were 1053.53±16.85 days and 1329.25±14.53 days, respectively. The average life time milk yield and total lactation length were 5615.98±372.12 kg and 1183.92±67.81 days, respectively. The season and period of birth had no effect on life time milk yield and total lactation length. However significant effects were reported on AFS and AFC. Variability in traits indicated that there is scope of improvement through management.

Key words: Age at first calving, Age at first service, Longevity (herd life), Life time calf production, Life time milk production, Productive herd life, Total lactation length

The life time traits are important for economic point of view on rearing the dairy animals. Lifetime calf production and their survival up to age at first calving are important traits in dairy that is related with the better replacement of old and low producer animals. Dairy cattle are being improved by selective breeding at a slow rate of genetic gain. The ultimate goal of the animal breeder is to acquire maximum return per unit incurred during life time of a cow. Moreover, highest profits come from high yielding cows that are able to remain in the herd for several lactations. Cows leave herds for many reasons, including low yield, poor health, reproductive failure, mastitis and deaths. This investigation was undertaken to assess the performance of longevity (herd life), productive herd life, life time calf production, life time milk yield**,** total lactation length**,** age at first service and age at first calving traits in an organized herd.

Present address: [1]Principal Scientist (e mail: usinghas @gmail.com), [2-4]Senior Scientist, Department of Animal Genetics and Breeding.

MATERIALS AND METHODS

The data on 752 lactation records of 190 Sahiwal cows maintained at Government Sahiwal Cattle Breeding Farm, Chakganjaria, Lucknow, during 1983-99 were utilized. The traits such as longevity (herd life), productive herd life, life time calf production, life time milk yield, total lactation length, age at first service and age at first calving were calculated from available records. The entire duration was divided in to 3 periods based on year of birth as P1 (1983–87), P2 (1988–93) and P3 (1994–99) and each year of birth was further classified into 3 seasons, viz. S_1 winter (November to February), S_2 summer (March to June) and S_3 rainy (July to October) based on climatic conditions. The data was analyzed using both the software PC Package SPSS and Harvey 1990.

RESULTS AND DISCUSSION

Longevity and productive herd life

Longevity is defined as true herd life or the length of time between dates of birth to date of culling/death of animal. In

the present study the average herd life (longevity) was found 3199.39±100.48 days (8.76 years) and productive herd life was 1872.28±100.28 days (5.13 years) Table 1, which was higher than the values reported by most of the workers (Gandhi 1986, Shafiq *et al.* 1995 and Kannan and Gandhi 2004). However, Kumar (2007) reported higher longevity (9.12 years) in Hariana cattle. These traits were significantly influenced by period of birth whereas season of birth had no effect. The cows born in the S1 (Nov-Feb) were found longest herd life of 3349.86±158.90 days (9.17 years) and productive herd life of 2001.64±158.59 days (5.48 years). However, shortest herd life and productive herd life were observed to be 3074.15±201.63 days (8.42 years) and 1726.84±201.24 days (4.73 years), respectively in the S3 (Jul-Oct). The cows born in the P1 (1983–87) were found longest herd life 3449.25±166.43 (9.45 years) and the productive life 2093.02±166.11 (5.73 years), however, the shortest herd life and productive herd life were 2923.59±200.79 days (8.00 years) and 1585.80±200.41 days (4.34 years) in the P3 period.

Total lifetime calf production

The average number of total calves produced by each cow during its life times for this herd was found 4.19±0.20 (Table 1). It was significantly affected by period of birth whereas season of birth had no effect on it. The highest number of total calves born was observed in S1 (4.45±0.31) and Ist period of birth (4.55±0.32). However, it was lowest in S3 (3.95±0.39) and P3 period of birth (3.71±0.39). Abbas *et al.* (2010) reported lesser number of total calves produced by Sahiwal cows in comparison to present study. However, Kumar *et al*. (2009) reported higher total calves born (5.2±0.16) in Hariana cows. It was observed that 45.52 per cent (86) cows delivered 4 calves in her life time, however only 35.2% per cent (67) cows delivered more than 5 calves and completed 5th and above lactations.

Life time milk yield and total lactation length

The average life time milk production and total lactation length were 5615.98±372.12 kg and 1183.92±67.81 days, respectively. The season and period of birth had no significant effect on TLL and LTMY (Table 1.). These estimates were lower to the estimates reported by Kumar *et al.* (2009) and Bajetha (2006), however higher estimates of mean LTMY were observed by Kannan and Gandhi (2004) and Kumar *et al*. (2009) in Sahiwal cows. The Cows calved during S1 season (6346.64 kg±581.26) and P1 period of birth (5965.18 kg±583.46) had highest LTMY, whereas cows born during P2 period had lowest mean of 4994.04±542.25 kg LTMY. Gandhi and Gurnani (1988), Deulkar and Kothekar (1999), Kannan and Gandhi (2004), Dubey (2004) and Bajetha (2006) also reported significant effect of period of birth on LTMY. The highest TLL (1259.40 days±105.92) was observed in the first season (S1) of birth.

Age at first service and calving

The average age at first service and age at first calving were 1053.53±16.85 days (2.88 years) and 1329.25±14.53 days (3.64 years), respectively (Table 1). The season and period of birth had significant effect on age at first service and age at first calving. The shortest age at first service was

Table 1. Least squares means of herd life, productive herd life, total number of calves, total lactation milk yield, total lactation length, age at first service and age at first calving across the season and period of birth

Effects	NOS	Least square means±SE		NOS	Least square means±SE		NOBS	Least square means±SE		
		AFS (day)	AFC (days)		LTMY (kg)	TLL (days)		Longevity (herd life) (days)	Productive life (days)	Total number of calf born
Over all mean	186	1053.53 ±16.85	1329.25 ±14.53	154	5615.98 ±372.12	1183.92 ±67.81	166	3199.39 ±100.48	1872.28 ±100.28	4.19 ±0.20
Season of birth		*	*		NS	NS		NS	NS	NS
S1	75	1057.69 [b] ±25.84	1343.44 [b] ±22.28	63	6346.64 ±581.26	1259.40 ±105.92	65	3349.86 ±158.90	2001.64 ±158.59	4.45 ±0.31
S2	70	1009.06[a] ±26.73	1292.78 [a] ±23.05	57	5452.82 ±579.03	1152.38 ±105.51	64	3174.05 ±156.92	1888.36 ±156.62	4.16 ±0.31
S3	41	1093.84 [b] ±34.32	1351.54 [b] ±29.59	34	5048.48 ±736.05	1139.99 ±134.13	37	3074.15 ±201.63	1726.84 ±201.24	3.95 ±0.39
Period of birth		**	**		NS	NS		**	**	**
P1	60	1073.57 [b] ±28.79	1365.97 [b] ±24.82	56	5965.18 ±583.46	1275.39 ±106.32	56	3449.25 [c] ±166.43	2093.02 [b] ±166.11	4.55 [b] ±0.32
P2	77	1005.80 [a] ±25.76	1262.52 [a] ±22.20	68	4994.04 ±542.25	1105.23 ±98.81	72	3225.32 [b] ±150.81	1938.02 [b] ±150.52	4.30 [b] ±0.29
P3	49	1081.22 [b] ±31.79	1359.25 [b] ±27.41	30	5888.72 ±790.31	1171.15 ±144.02	38	2923.59[a] ±200.79	1585.80 [a] ±200.41	3.71 [a] ±0.39

NS, Nonsignificant; * significant at P<0.05, ** significant at P<0.01.

observed in the S2 summer season (1009.06±26.73 days) and P2 period of birth (1005.80±25.76 days). The shortest age at first calving was also observed in the S2 summer season (1292.78±23.05 days) and P2 period of birth (1262.52±22.20 days).

Incidence of abnormal calving

During the study, it was observed that 698 calvings were normal and 54 calvings were abnormal. The incidence of abnormal calving was 7.10%, which include abortion (3.91%) and stillbirth (3.19%). The ratio of male and female birth was 49:51. The higher percentage of male birth in Hariana first calvers was reported by Singh *et al.* (2004).

ACKNOWLEDGEMENTS

Authors are thankful to the Director, PDC, Meerut for providing necessary help to conduct the study and Director, Animal Husbandry (Uttar Pradesh) for providing the data from Government Sahiwal Cattle Breeding Farm, Chakganjria, Lucknow.

RERERENCES

Abbas A, Gowane G R and Chandran P C. 2010. Selective value of Sahiwal cows in an organized herd. *Indian Veterinary Journal* **87**: 568–71.

Bajetha G. 2006. 'Sire evaluation of Sahiwal and Crossbred cattle.' Ph. D. Thesis, G. B. Pant University of Agriculture and Technology, Pantnagar, India.

Deulkar P B and Kothekar M D. 1999. Sire evaluation considering first lactation yield for improvement of lifetime production in Sahiwal. *Indian Journal of Animal Sciences* **69** (2) : 240–42.

Dubey P P. 2004. 'Comparison of different sire evaluation methods in Dairy cattle.' M. Sc. Thesis, G. B. Pant University of Agriculture and Technology, Pantnagar India.

Gandhi R S and Gurnani M. 1988. Association amongst different productive and reproductive traits in Sahiwal cattle. *Asian Journal of Dairy Research* **7**: 171–73.

Gandhi R S. 1986. 'Selection of optimum combinations of early traits for maximizing genetic improvement in Dairy cattle.' Ph. D. Thesis, Kurukshetra University, Kurukshetra.

Harvey W R. 1990. User's Guide for LSMLMW and MIXMDL. PC-2 Version. Mixed Model Least Squares and Maximum Likelihood Computer Program. Ohio State University, Columbus, USA.

Kumar A. 2007. Longevity and productive herd life of Hariana cattle. *Indian Veterinary Journal* **84**: 51–53.

Kumar A, Gandhi R S and Paul A K. 2009. Genetic evaluation of lifetime traits in Sahiwal cattle. *Indian Journal of Dairy Science* **62**: 31–34.

Kumar A, Singh U, Khanna A S and Singh R P. 2009. Genetic and non genetic variability in selective value of Hariana cows. *Indian Journal of Animal Sciences* **79** (3) : 388–91.

Kannan D and Gandhi R S. 2004. Influence of non-genetic factors on lifetimes traits in Sahiwal. *Indian Journal of Dairy Science* **57**: 185–91.

Shafiq M. Saleem M, Mahmood H A and Akhtar P. 1995. Performance of Sahiwal cows up to 4th calving under sub-tropical environment. *Pakistan Veterinary Journal* **15**: 20–25.

Singh B, Kumar D, Singh H, Parsad R B and Singh J B. 2004. Genetic studies on sex ratio in dairy cattle. *Indian Journal of Animal Sciences* **79** (7) :986–88.