FACTORS AFFECTING AGE AT FIRST CALVING IN SAHIWAL CATTLE UNDER JHARKHAND RURAL CONDITIONS

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ABSTRACT

Data on 1341 Sahiwalprogeny born during 2007 to 2012 and maintained by 1239 farmers' across 22 districtsin Jharkhand state and reaching age at first calving(AFC) were collectedand analyzed for the purposes of this study. The animal housing type ranged from open to permanent constructed sheds. Animals were semi stall fed with dry and green fodder along with concentrate. The information on agriculture zone (Central North Eastern plateau, Western plateau, South Eastern plateau), farmer category (General, other), progeny birth year (2007, 2008, 2009, 2010, 2011, 2012), dam breed (Non-descript, other), progeny birth season (rainy, winter, summer) and progeny sire were compiled for studying the effect of these factors on age at first calving. Results indicated that the overall AFC was recorded was45.37±0.23 months, which was at par with that of DeoniandKankrejcattle (45.70±0.52 & 45.27±0.48 months) and it was lower to Khillar (49.39±0.13 months), Amrit-mahal (50.65±0.63months), Sahiwal cattle (49.34 months).Results further showed that the progeny birth year, birth season and progeny sire had important bearing on bringing about improvement in age at first calving in Sahiwal cattle at Jharkhand rural conditions.

Key words: Sahiwal cattle, age at first calving, factors affecting AFC, Jharkhand rural conditions

Introduction

In Jharkhand state of India, no recognized breed of cattle exists. The native cattle are of small frame, low height and weighs about 100 to 150 Kg, yielding 0.5 to 1.5 liters of milk per day

(GoJ, 2014). Cross breeding programme was not widely accepted due to lack of proper breeding strategy, non-adoption of Artificial Inseminations (AI) due to inadequate availability of door-step breeding services, distant location of AI centres, timely non-availability of doctors and preference for natural service (Pandey and Kumar 2003). Age at first calving (AFC)is the period from birth of female calf till she calves for first time to begin her productive life. An early first calvershave longer productive life and have a desirable effects on herd economics due to reducing cost of rearing. Many published reports (Ulmek, 1990, Khatri, 2004, Kushwaha, 2008, Kathirwan et al 2009, Dangar and Vataliya, 2014, Pareek et al, 2016) are available on factors affecting AFC but all are observations related to organized farm animals. Jharkhand state because of its differential geo-agro topography and social situation, presents a situation necessitating consideration of Sahiwal breed performance which as yet has not been reported. In the light of scanty reports available, the present study was undertaken to analyze and report the status and importance of factors affecting AFCinSahiwal animals.

Materials and Methods

Due to the joint animal breeding program efforts between Department of DairyDirectorateJharkhandstate and Bhartiya Agro Industries Foundation (BAIF), a total of 6752 Sahiwal progeny has been produced during the period from 2007 to 2012, maintained by 1239 farmers' across 22 districts of the state, out of which 1341 have reached to age at first calving. The housing of these animals ranged from open to permanent constructed sheds, animals are semi stall fed with dry and green fodder along with concentrate. The information on agriculture zone (Central North Eastern plateau, Western plateau, South Eastern plateau), farmer category (General, other), progeny birth year (2007, 2008, 2009, 2010, 2011, 2012), dam breed (Non-descript, other), progeny birth season (rainy, winter, summer) and progeny sire (Kamraj, Karan, Kaustubh, Kedar, Kumar, Kumbh, Kumod) were compiled for studying age at first calving related to these factors. The data were analyzed using statistical methods suggested by Snedecor and Cochran (1967) and significance within subgroups was tested by Duncans Multiple Range Test as modified by Kramer (1957).

Results and Discussion

Mean age at first calving and standard error for different factors affecting AFC are presented in Table-1.Overall AFC was recorded as 45.37±0.23 months, which was at par with that of DeoniandKankrejcattle (45.70±0.52 & 45.27±0.48 months) reported by Singh etal. (2006)

and Parekh et al. (2016), respectively and it was lower than Khillar (49.39±0.13 months), Amrit-mahal (50.65±0.63months), Sahiwal cattle (49.34 months) reported by Gokhaleet al. (2008), Govindaiahet al.(2005) and Pundir and Ahlawat (2006) respectively. The AFC reported in present investigation is lower by almost one month as compared to Sahiwal cattle at organized farms (46.96 and 46.84 months) reported by Patil and Duduskar (1980) and Bhosale (2001), respectively, Dangar and Vataliya (2014) in Gir cattle (49.02±3.65 months), Khatri (2004) in Red Singhicows,Kushwahaet al. (2008) in Rathi cattle (48.75±10.33 months).

Agriculture Zone: The Jharkhand state is divided into three agro-climatic regions. The central north-eastern plateau constitutes around 44 percent of the geographical area.It is most densely populated part of the state.The districts under study included in the region are Chatra, Koderma, Hazaribag, Bokaro, Dhanbad, Giridih, Deoghar, Dumka, Pakur, Godda, Jamtara, Sahibganj and Ranchi. The western plateau constitutes 39 percent and it is least urbanized. The districts of the region are Garhwa, Palamu, Latehar, Logardaga, Simdega, Gumla and Khunti. The southern eastern plateau constitutes 17 per cent and population density is much less. This region has districts of West Sighbhum and Saraikela. The state has erratic and uneven distribution of rainfall and humid and sub-humid tropical monsoon (Anonymous, 2017).The analysis revealed that AFC of the Sahiwal animal is not found affected due to agro-climatic zones although animals from south eastern zone recorded lowerAFC(43.92±1.23 months) compared to central north eastern plateau (45.60±0.28 months). The coverage of highest animals (71.29%) was from central north eastern plateau regions.

Farmer category: The farmers owning the Sahiwal cattle were divided in two categories as general and others which includes other backwards, scheduled cast, scheduled tribes etc.The general category farmers owned 71.96 per cent animals but AFC of animals was recorded by 9 days less (45.17±0.42 month) from other category farmers. The differences in AFC among category of farmerswerenotfound statistically important.

Birth year: Study of **y**ear wise**n**umber of progeny**b**orn**d**uring the period of six years from 2007 to 2012 under study revealed that highest births (38.26%) were recorded in 2010, followed by 2011 (28.04%), 2009 (17.90%) and lowest in the year 2007 (4.03%). The birth year significantly affected AFC.Khan et al. (1999) and Javed et al. (2000) during their study on Sahiwal cows alsofound significant effect of year of birth on age at first calving. The progressive

Progeny birth year-wise AFC (months)
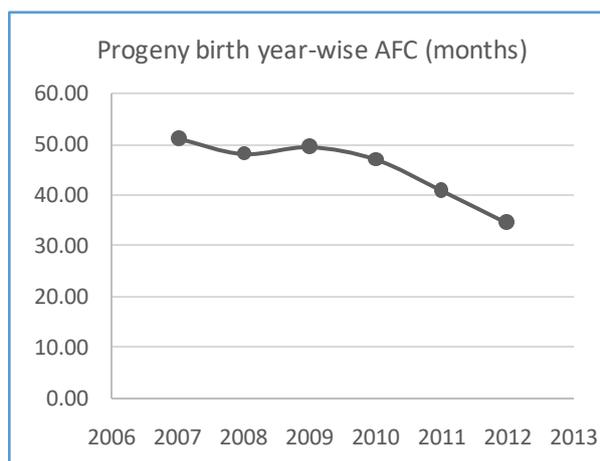
reduction on mean AFC over the period of time can be attributed to increased awareness regarding overall management of animals among farmer community. The efforts taken in farmer's training, progressive experience gathered in implementation of the development program and Govt. of Jharkhand providing support through their heifer rearing programme could be the factors revealing progressive reduction. The AFC of animals born during 2007 was 51.25±1.32 months which was reduced to 34.61±0.67 months for animals born in 2012.The reports of Negussie et al. (1998) and Masama et al. (2003) indicated that management factors especially nutrition determines pre-pubertal growth rates and reproductive development. The better-managed and well-fed heifers grew faster, received service earlier and resulted in more economic benefit in terms of more milk and calves produced during the lifetime of the animal.

Dam breed: The Jharkhand state have not any recognized breed of cattle hence artificial inseminations programme was mostly based to non-descript (ND) cattle which indicated 92.92 per cent of ND animals' coverage and remaining 7.08 per cent other animals which may include graded animals crossed with exotic breeds. Although AFC of non-descript animals recorded higher (45.52±0.24 months) to that of other breed (43.44±0.96 months) it was not affected significantly due to dam breed.

Birth season: It was noticed that calves born during winter season grew comparatively well exhibiting significantly lower AFC of 44.94±0.39 months followed by progeny born in summer season (45.37±0.37 months) and rainy seasons (45.91±0.45 months). The significant effect of season of birth on AFC has also been reported in Sahiwal cattle by other workers like Roy et al. (1985).Tajane and Rai (1990),Kumar (2007). The reports of Japri et al. (1997), Mohanty (2001), Kannan and Gandhi (2004), Kumar (2003), Banik (2004), Raja (2004), Singh et al. (2005), Bajetha (2006), Sentitula (2007), Kathiravan et al. (2009), Manoj (2009),

Raja (2010), Monalisa et al. (2010), Wakchaure and Meena (2010) however did not find any effect of season of birth on AFC in Sahiwalcattle.Thespread of number of animals born in winter and summer were similar (>35%) although in rainy season it was slightly lower (28.56 per cent). The significant lower AFC for animals born in winter season might be attributed to favorable environmental conditions and feed and fodder availability owing to previous rainy seasons.

Sire used: The progeny groups from seven Sahiwalsireswere available for comparison. Between siredifferences were noted highly significant (P<0.01) and important. It was noticed that the progeny of sire Kumbh recorded lowest AFC of 41.91±2.71 months compared to progeny of other sires used but percent contribution of this sire was less than one per cent (0.60). The contribution of Kedar sire was highest (79.27%) and AFC of progeny born out of this sire recorded as 45.25±0.25 months. Significance of sire effect on AFC of progeny has also been reported by Hammoud et al. (2010) and Pareek et al. (2016) in Egyptian Friesian and Kankrej cows, respectively. Significant difference between sires could effectively be used in sire selection for bringing about improvement in age at first calving thus improving the economic performance of the herd.

Summary

Based on the results obtained in the present investigation it can be concluded that progeny birth year, birth season and sire used need to be emphasized for having better age at first calving in Sahiwal cattle at Jharkhand rural conditions.

Acknowledgment

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Table-1.Factors affecting AFC in Sahiwal cattle

#	Parameters	Factors	No. of observations	% coverage	Mean & SE
1	Agriculture Zone	Central North Eastern plateau	956	71.29	45.60±0.28
		Western plateau	346	25.80	44.93±0.43
		South eastern plateau	39	2.91	43.92±1.23
2	Farmer category	General	965	71.96	45.45±0.28
		Others	376	28.04	45.17±0.42
3	Birth year	2007	54	4.03	51.25±1.32[a]
		2008	85	6.34	48.17±0.93[b]
		2009	240	17.90	49.50±0.52[ab]
		2010	513	38.26	47.10±0.31[cb]
		2011	376	28.04	41.00±0.35[d]
		2012	73	5.44	34.61±0.67[e]
4	Dam breed	Non-descript	1246	92.92	45.52±0.24
		Others	95	7.08	43.44±0.96
5	Birth season	Rainy	383	28.56	45.91±0.45[a]
		winter	477	35.57	44.94±0.39[b]
		Summer	481	35.87	45.37±0.37[c]
6	Sire used	Kamraj	73	5.44	49.15±0.95[a]
		Karan	26	1.94	48.47±1.53[b]
		Kaushtubh	56	4.18	45.27±1.40[ab]
		Kedar	1063	79.27	45.25±0.25[cb]
		Kumar	22	1.64	44.37±2.01[ab]
		Kumbh	08	0.60	41.94±2.71[b]
		Kumod	93	6.94	43.52±0.86[b]
Overall			1341	100	45.37±0.23

Means having same superscripts within columns did not differ significantly (P<0.01)