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BC Naha
Ph.D. Scholar, Animal Genetics Division, ICAR-IVRI, Izatnagar, Bareilly, Uttar Pradesh, India

AK Chakravarty
PS, Dairy Cattle Breeding Division, National Dairy Research Institute, Karnal, Haryana, India

MA Mir
Ph.D. Scholar, Dairy Cattle Breeding Division, National Dairy Research Institute, Karnal, Haryana, India

BL Saini
Ph.D. Scholar, Animal Genetics Division, ICAR-IVRI, Izatnagar, Bareilly, Uttar Pradesh, India

P Boro
Assistant Professor, College of Veterinary Sciences and Animal Husbandry R.K Nagar, Tripura, India

Supradip Das
Veterinary officer, Animal Resources Development Department, District Composite Livestock Farm, Dhalai, Tripura, India

Correspondence
BC Naha
Ph.D. Scholar, Animal Genetics Division, ICAR-IVRI, Izatnagar, Bareilly, Uttar Pradesh, India

Factors affecting birth weight, age at first semen freezing and age at first semen use of breeding bulls: A review

BC Naha, AK Chakravarty, MA Mir, BL Saini, P Boro and Supradip Das

Abstract
Bulls are half of the herd has changed to more than half of the herd". The birth weight is very important to breeders in judging the health of calf and its dam and also gives a good indication of the subsequent development of animal. The factors viz., period, season, breed, stage of lactation, and parity mainly affect the birth weight, age at first semen freezing and age at first semen use of breeding bulls. Age of the bull at the time of mating was the major factor influence the semen quality traits. Therefore, semen quality traits of breeding bulls is of great concern for herd profitability.

Keywords: Age at first freezing, age at first use, birth weight, breeding bulls

Introduction
Profitability of dairy farms depends on many factors, one of which is the reproductive efficiency of dairy cows [3]. More than 52% indigenious young bulls inducted for semen collection programme had problems with semen quality and libido [6]. The demand for the best bulls has increased considerably as bull plays an important role in a successful reproductive management programme [4].

Due to lack of scientific selection of bull based on their performance, there may be possibility of serious deterioration in the quality of indigenous germplasm. In a breeding farm, extent of variations of semen quality over a long period may depend on existing macro- and micro-climatic conditions, feeding and general management, besides the sexual activity of the bull influenced by surrounding environment during semen collection. Semen quality is affected by genetic constitution of bull, age of the bull, reproductive health status of bulls and technical skills in collection and processing of semen. The population of breeding bulls in India is gradually declining due to less adoption of systematic breeding plans under field condition. To mitigate the above problem, special attention is required to make available sufficient number of frozen doses from superior bulls. There is little information on the effects of non-genetic factors on semen quality traits of breeding bulls particularly age at first semen freezing and age at first semen use.

Birth weight of breeding bulls
The weight of the newly born calf is importanct to breeders in judging its health and gives a good indication of the subsequent development. The birth weight of Sahiwal male calves was found to be ranging between 21.6 ± 2.3 kg [5]. The birth weight of Sahiwal, KF and Murrah bulls were estimated as 20.54, 27.83 and 32.63 kg, respectively in the NDRI herd [1]. The average birth weight in Sahiwal bulls was estimated as 22.19 ± 0.05 kg [10].

Effect of period and season of birth on birth weight of breeding bulls
The birth weight of Sahiwal cattle was significantly (<0.01) affected by period of birth [2]. The overall least-squares means for birth weight was estimated as 35.09±0.16 kg and period of birth had significant effect (p<0.01) on birth weight in Murrah bulls [7, 8]. The overall least-squares means for birth weight was estimated as 22.04 ± 1.08 kg in Sahiwal breeding bulls and period of birth had not influenced the birth weight of Sahiwal bulls [10]. Season of birth reflect due to feed and fodder availability, environmental temperature and humidity. Period of birth reflect due to management of that period may be better.

Age at first semen freezing of dairy breeding bulls

Age at first semen freezing was defined as the time span between date at first semen freezing and date of birth of Sahiwal bulls. Literature on age at first semen freezing of breeding bulls are scanty. Freezing of semen is an important criterion for evaluating a bull, and the aim is to get sufficient number of frozen semen doses from a Sahiwal bull at the beginning of the progeny testing programme [8]. The main target of using frozen semen for AI in progeny testing breeding program is to use the bulls randomly i.e., all bulls must have almost the same number of AI at completion of set and all bulls must be used from the beginning of the set [7] . AFSF of Sahiwal breeding bulls was estimated as 3.17±0.01 years with the coefficient of variation of 18.93% [10]. The AFSF of Murrah bulls was estimated as 3.46 ± 0.08 years with the coefficient of variation of 14.43% [7].

Effect of period and season of freezing on age at first semen freezing of dairy breeding bulls The overall least-squares means for age at first semen freezing of Murrah bulls was estimated as 3.38 ± 0.01 years [7]. Periods and seasons of first freezing had significant effect (p<0.05) on age at first semen freezing in Sahiwal bulls [9, 10] Naha *et al.* (2015) reported that the overall least-squares mean for age at first semen freezing was estimated as 3.14±0.09 in Sahiwal breeding bulls. They found that only period of freezing had significant effects on age at first semen freezing (p<0.01) but season had no significant effect on trait. Period and season of freezing had significant effect (p<0.01) on age at first semen freezing in Murrah bulls [8].

Age at first semen A.I. / use of dairy breeding bulls

Age at first semen A.I. / semen use was defined as difference between date at first A.I / semen use and date of birth of Sahiwal bulls. The age at first semen use of Sahiwal breeding bulls was estimated as 5.35±0.01 years, with the coefficient of variation of 20% [10]. Age at first semen use of Murrah bulls was estimated as 4.05 ± 0.13 years with the coefficient of variation of 12.27% [7, 10] Naha *et al.* (2015) reported that the overall least-squares mean for age at first semen use was estimated as 5.25±0.02 years in Sahiwal breeding bulls. They also studied that period of semen use had significant effects on age at first semen use (p<0.01) but season had no significant effect on the traits.

Effect of non-genetic factors on age at first semen A.I / use of dairy breeding bulls

Literature was scanty available regarding the effect of non-genetic factors on age at first A.I / semen use. The overall least-square mean for age at first semen use was estimated as 5.25±0.02 years in Sahiwal breeding bulls [10] and 3.96±0.03 years in Murrah breeding bulls [10, 10] Naha *et al.* (2015) reported period of semen use had significant effect (p<0.01) on age at first semen use in Sahiwal bulls. [7, 8] Mir *et al.* (2015) reported the period and season of semen use had significant effect (p<0.01) on age at first semen use in Murrah bulls.

Conclusion

It can be concludes that better breeding management should be implemented along with multi-trait evaluation with reproductive traits may be carried out for simultaneous improvement of reproductive performances of dairy breeding bulls. At the same time, however, it is worthwhile to bear in mind that more detailed data collection under improved energy based feeding and management could possibly lead to further reduction of age at first semen freezing and age at first semen use of dairy breeding bulls.

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