

Optimization of age and weight at first calving in dairy cattle

– A way forward to enhanced productivity

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Dairy industry in India has grown at tremendous rates since independence. Milk production has increased from 17 million tonnes in 1950 to 165.4 million tonnes (DAHDF Annual report, 2017-18). The per capita availability of milk has been increased from 130 g/day to 355 g/day during the same period of time, which is higher than the world average of 293.7 g. Currently, India is having 2nd largest population of cattle and highest milk production (ranks 1st) in the world due to large buffalo population. In spite of highest milk production, the productivity per animal is very low in our country due to shortage of fodder and lack of sound managerial practices. In addition, India has large proportion of non – descript cattle population which have long age at first calving and shorter productive life which needs to be upgraded by breeding with bulls of high genetic merit. Crossbreds developed in the country have exhibited better results than the indigenous breeds and even better than the exotic breeds due to enhanced heat tolerance, which can be attributed to the presence of indigenous blood.

Key words: Age at first calving, Dairy, Optimization

AGE at first calving (AFC) can be defined as the age at which animal calves for the first time. It is affected by various factors like genetic makeup, environmental conditions, management practices and feeding standards followed at dairy farm. Any advancement in the age at first calving may lead to loss of productive life of the animal thus increasing the overhead cost of rearing, feeding and overcrowding through maintenance of larger number of unproductive animals at farm. The dairy producers or farmers should target faster growth in heifers to reduce AFC, which can be bred when attain 60–65% of their mature body and 85–90% of body weight at the time of calving. Balanced feeding and environmental augmentation i.e. maintenance of optimum thermal humidity index of less than 72, are some of the effective strategies to

promote the optimum growth in growing dairy cattle. Breeding should be done after 2 oestrus cycles following the age at puberty for better conception rate. The proper heat detection at appropriate time is absolutely necessary as missing of one heat cycle may cost very significant amount of production losses for a period of 21 days.

Why to optimize the AFC

The optimization of AFC in dairy cattle is needed because it lowers the overhead cost and feeding cost, decreases overcrowding and increases the productivity of herd. It decreases the non-productive life of the dairy animals, reduces the rearing cost, minimize the chances of accumulating heifers in replacement pool of the farm. The feed consumption and labour requirement are also less which helps in better management of

existing herd. Generation interval is reduced and there are more introductions of genetically superior individuals in the herd. It is observed that rearing cost of dairy cattle get increased above and around ₹ 3000 for each month delayed in AFC.

Factors affecting AFC

The events that occur during the time of parturition, gestation and prior to the gestation have direct or indirect effects on AFC. The growth and development of calves during early life are affected by level of nutrition, health status and environmental conditions in which they are reared. The AFC increases by the conditions like dystokia (difficult birth of calf), long duration of illness and higher environmental variables causing discomfort to the animals. There is significant reduction in first lactation milk yield when the AFC is

reduced but there is increase in productive life of the cow so the overall profit from the farm is increased, if reduced AFC is targeted.

How to optimize the AFC

The optimization of AFC in heifers can be possible by breeding them at right time. They should be bred after passing of 2 or 3 heat cycles. The heifers should be reared on balanced ration during the early phase of life so that they could attain 50 – 55 % of the mature body weight at the time of puberty. The management practices that are to be followed for optimizing the AFC in heifers include balanced feeding, improved housing and health management, which are described as follows.

Management of animals during early age

- Immediately after birth, the calves should be fed colostrum at the rate of 1/10th of their body weight for first 3 to 5 days. The colostrum is rich in proteins, minerals, vitamins and more importantly it provides passive immunity to the calves which protect them from diseases during the early life.
- For achieving faster growth, whole milk should be continued for first two or three months; however, it can partially be replaced with good quality milk replacer from 4th week onwards. The calf starter and quality fodder may be given *ad lib.* from 2nd week of age.
- The young calves or heifers should be kept in clean and dry place to

prevent infection.

- The administration of bovine somatotrophin at rate of 25 µg/kg of body weight in heifers can increase the daily body weight gain and weight at puberty by about 10% and 25 kg, respectively and reduce the age at puberty by 24 days.
- Feeding of ionophore compounds in heifers may bring early targeted body weight at puberty, which can decrease the AFC by 61 days.

Housing management

House should be clean, dry and well ventilated. The air circulation, temperature and humidity in animal sheds should be controlled. Animals of same age group should be housed together and overcrowding should be avoided. Overcrowding in the house may increase the chances of respiratory diseases. Large group pen housing increases the chances of diarrhoea in calves. The orientation of house should be in such a way that maximum advantage of sunlight can be taken as per the existing climatic conditions.

Housing design of growing heifers should be in accordance to provide maximum comfort during the summer as heat stress adversely affects estrus cycle and behaviour which may negatively impact AFC. The strategies to provide cool environment are based mainly on heat exchange mechanism i.e. conduction, convection, radiation and evaporation. High pressure mist cooling and wetting the animal's body surface are very common which

are followed at many organized dairy farms. Improved understanding of photoperiod effects on dairy cattle has allowed producers to maximize beneficial effects of photoperiod length and minimize negative effects.

Health management

Health status has direct influence on performance of dairy animals. The health should be regularly monitored since the birth of the calf. The calving should be facilitated in clean and hygienic environment. Apart from proper feeding, housing and other management cares, preventive health measure like vaccination and deworming practice should be followed as per the recommended standards. If the days in illness increase then the AFC also increases and it reduces the growth rate and future performance of animals.

SUMMARY

Heifer rearing period involves considerable capital expenditure that includes feeding, housing and veterinary expenses. The cost of rearing can be minimized by attaining optimum age at first calving which can also increase the lifetime milk production of dairy animals. The age at first calving is low heritable trait, which can be optimized if proper management practices are followed in view of higher profitability at dairy farm.

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Jai Kisan, Jai Vigyan

- A total of ₹ 788.33 crores have been sanctioned for opening six new agricultural colleges for eastern India under Central Agricultural University, Imphal, and a new Central Agricultural University in Meghalaya.
- For the establishment of two new agricultural research institutes in Asom and Jharkhand, a sum ₹ 100 crores is allocated.
- First academic session of the Rani Lakshmibai Central Agricultural University has been allocated for four new agricultural colleges in Ditiya and Jhansi.
- An Memorandum of Understanding was signed for transforming the Rajendra Central Agricultural University, Pusa, Samstipur, Bihar. A proposal of ₹ 400 crores is submitted in EFC.
- Post-Graduate Institute of Horticulture is being established in Amritsar, Punjab.
- Foundation stone of the Indian Institute of Agricultural Biotechnology is laid at Ranchi for promoting agricultural biotechnology.