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Popular Article

Strategies For Reducing Age at First Calving in Dairy Animals

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Introduction

Raising heifers is one of the most expensive components of the dairy farm operations as they are future of dairy farm. They are produced to replace the older and uneconomical females of the farm through culling. When genetic trends are positive, such replacements help harvest the benefits of genetic gain. Heifer production is most expensive part of the dairy farm operation as it requires more inputs for a longer period of time with no visible returns than any other farm operation. The major issue is the lower growth rate of calves during early months of their age and just after weaning which is either due to underfeeding or imbalanced feeding which results in higher age at puberty and thus higher age at first calving in heifers. Genetics also play its role as well. Age at puberty and calving is related with weight. Heifers can be bred when they have attained 60% of their adult body weight. Assuming an average adult weight of a buffalo as 550 kg, buffalo heifers can be bred when they have attained a weight of about 330 kg. Balanced feeding, improved management, using performance modifiers and better health care facilities can be helpful in reducing the age at first calving thereby reducing cost of heifer production. Mostly, dairy breeds of the tropics and sub-tropics are slow maturing and low milk producers, this inferiority is partly inherited and partly due to the malnutrition, management and environment to which they are exposed. In tropical climates buffaloes are preferred over cattle because of their better efficiency in utilization of nutrients from poor quality fibrous tropical feeds and relatively better disease resistance and adaptability to tropical climates.



Management Of Age at First Calving (AFC)

Herds can minimize the variability in AFC by obtaining high pregnancy rates, but poor reproduction increases variability in AFC, although nutrition and growth rates may be adequate. Therefore, reducing the age of onset of puberty, early breeding, and thereby reducing age at first calving (AFC) is the obvious option to minimize expenses on these heifers. The AFC can be reduced by a combination of increasing pre-pubertal average daily gain and decreasing age at breeding or by reducing age at breeding alone.

- **Breeding season:** Buffalo is partially seasonal breeder. Acc. To a study, buffaloes calving in summer (June to August) had a shorter calving interval than those calving in other seasons. The longest calving interval was observed in buffaloes calving in winter (December-January). This means that the buffaloes that had calved just before the onset of their breeding season (October-November) had more chances of getting bred than those calving after passing their breeding season. This implies that the buffalo heifers attaining their proper weight just before their breeding season are more likely to get bred than those passing this period and thus may have lower age at puberty and consequently at calving than those attaining proper weight after this season. Based on this hypothesis, while raising the replacement buffalo heifers, efforts should be made to keep an eye on both critical weight of buffaloes for attaining the age at puberty and also the season in which this weight is attained. In this regard, adjustments in feeding regime may be required to get the critical weight of buffalo heifers just before their breeding season. Because once this breeding season is over then feeding for accelerated growth may not reduce the age at their puberty and then one has to wait for their next breeding season to see the puberty in the heifers.
- **Feeding:** In our country, calves are usually raised on fodders with limited amounts of concentrates low in protein and energy before and after weaning. This is one of the reasons for lower growth rate and delayed age at puberty in heifers. In buffalo calves, calf starter ration containing CP% and TDN%, 23-25% and 75% should be fed to achieve a higher daily growth rate. In our country, where there is no check on quality of concentrates for ruminants, offering a quality concentrate supplement with higher protein and energy may accelerate growth rate in the replacement calves with positive effects on reducing the age at puberty. Age at puberty can be reduced through additional concentrate feeding for a few months before the onset of puberty. Concentrates are supplemented with fodder to reduce the age at maturity.



- **Bio stimulation:** Bio stimulation (bull effect) can be defined as the stimulus provoked by the presence of males, which hastens onset of puberty, estrus and ovulation through genital stimulation, pheromones, or other external stimuli. Presence of a vasectomized bull has been reported to hasten the onset of puberty in heifers and also the early resumption of ovarian cyclicity following parturition.
- **Photoperiod:** Photoperiodism can be defined as the physiologic response of animals and plants to the variations of light and darkness. Seasonal changes in the photoperiod are a major determinant of reproductive activity. Management of photoperiod has influence on the attainment of puberty. So photoperiod is an effective noninvasive approach to improve performance of animals thereby achieving early puberty. Long day photoperiod (LDPP) i.e. 16-18 hrs light and 6-8 hrs dark during growth phase of animals is beneficial in attaining larger leaner animals at maturity with higher body weight gain.
- **Suckling vs hand feeding for calf health:** Direct suckled calves are healthier than weaned calves. The farmers should be encouraged to follow the indigenous practices that can enhance daily growth rate to get a healthier calf crop. It is also a need of hour to test whether weaning should or should not be practiced in Sahiwal cattle or Nili-Ravi buffalo as they have a very strong mother instinct to milk let down in the presence of calf which if weaned results into either abandoning of the lactation or milk let down through oxytocin.
- **Environment:** Performance of animals is a great challenge in tropical region due to high ambient temperature especially in summer month. Buffaloes are more susceptible to heat stress because of their dark colour and buffalo skin has one-sixth the density of sweat glands that cattle, so buffaloes dissipate heat poorly by sweating. Exposure of buffaloes to the hot conditions leads to depression in feed intake, efficiency and utilization, disturbances in metabolism of water, protein, energy and mineral balances, enzymatic reactions, hormonal secretions and blood metabolites. Such changes result in impairment of reproduction and production performances. The effect of heat stress is aggravated when heat stress is accompanied by high ambient humidity. Heifers reared under poor housing conditions reach puberty later than heifers reared under excellent housing conditions. Houses protecting buffaloes from direct heat and with proper ventilation favour faster growth in calves. Buffalo heifers allowed wallowing for more than 2 hours a day during summer months (April to September) attained puberty earlier at 30.45 months as compared to 42.55 months who



had given bathing once a day. Marked reduction in the age at puberty could be attributed to improved heat dissipation while bathing/wallowing

- **Bovine Somatotropin (bST):** Somatotropin is a hormone produced by the anterior pituitary, a small gland located at the base of the brain, and is transported by the blood to various body organs where it has its biological effects. It has been extensively used in ruminants for promoting growth and production. Injection of bST (25 µg/kg of body weight) in Holstein heifers increased daily body weight gain and weight at puberty by 10%, and 25 kg, respectively and reduced the age at puberty by up to 24 days. bST altered the intermediary metabolism in a manner that increased lean tissue and decreased fat deposition.
- **Ionophores:** Ionophores are antibiotics produced by a variety of actinomycetes. Feeding ionophores typically increases the efficiency of feed utilization in ruminant animals. Ionophores increase growth rate and decrease age at puberty in grazing heifers. Animals fed ionophores alone or in combination with anthelmintic leads to puberty at a younger age.

Conclusion

Different approaches to raise the heifers on economical basis and reduce their age of puberty have been summarized above. In any particular situation, one has to keep in view the cost of inputs involved and returns thereof. Any system that is more feasible in a given set of environments should be applied judiciously. In our system, forage should be the main feed supplemented with concentrates and other performance modifiers to gain a faster growth rate for early puberty on cost effective basis.

