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International journal of Advanced Biological and Biomedical Research

Volume 1, Issue 11, 2013: 1392-1396

Reproductive performance definition in dairy cattle: affective factors

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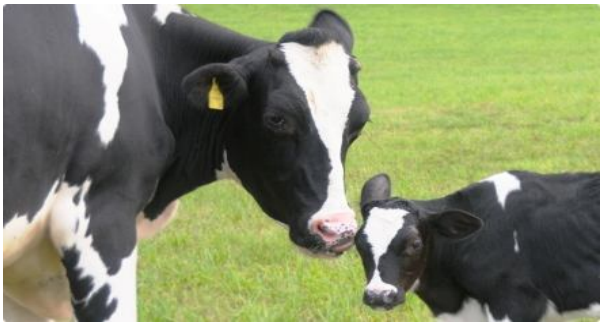
ABSTRACTS

The reproductive performance of a dairy herd has a significant effect on the profitability of that herd. Common measures of reproductive performance are days to first service, days to conception, calving interval, services per conception, conception rate, estrus detection rate, and pregnancy rate. Most cow operations would benefit economically by reducing the number of operational days, decreasing culling rates due to non-pregnant females, and shortening their calving interval. Several factors influence reproductive performance, but none require more visual attention than heat or estrus detection.

Key words: reproductive, performance, dairy cattle

INTRODUCTION

Reproductive performance. It is calculated as the number of cows that got pregnant divided by the number of cows that were eligible to get pregnant. It is a measure of the speed at which cows get pregnant after the voluntary waiting period. Pregnancy rate can be estimated as the conception rate x estrus detection rate if those are known. For example, a 50% estrus detection rate and a 40% conception rate result in a50% x 40% = 20% pregnancy rate; every 4 out of 5 eligible open cows did not get pregnant when they could have. Today's dairy cow may face a wide variety of environmental stressors. These may include heat stress, overcrowding, infectious challenge, poor ventilation, poor footing, uncomfortable stalls, poor management of grouping and cow movement, and rough handling. The effects of heat stress on dairy cattle physiology and productivity have been well established. Studies have shown that heat stress during late gestation reduces calf birth weight and subsequent milk production. Dry cows provided with shade gave birth to heavier calves and produced more milk than cows not provided with shade.



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Reproductive factors

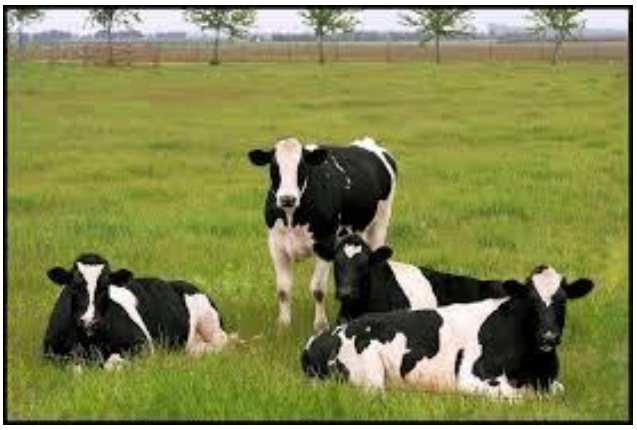
Age at first calving

First calving marks the beginning of a cow's productive life. Age at first calving is closely related to generation interval and, therefore, influences response to selection. Under controlled breeding, heifers are usually mated when they are mature enough to withstand the stress of parturition and lactation. This increases the likelihood of early conception after parturition. In traditional production systems, however, breeding is often uncontrolled and heifers are bred at the first opportunity. This frequently results in longer subsequent calving intervals. Basu (1983) studied that first conceived at between 15 and 37 months old in the Mexican Gulf coast. Of 111 heifers that first conceived at 15 to 24 months old, significantly more ($P<0.001$) did so during the dry season than during the wet season. However, among heifers that first conceived at more than 24 months old, most conceived during the rainy season and overall there was no significant difference between the percentages of heifers conceiving first during the rainy or dry season. Bazer (1973) observed that Nellore cows in Brazil that calved first in the dry season were younger than those that calved first in the rainy season. Mahadevan et al (1962) found that age at first calving in Brazilian Nellore heifers was significantly affected by year and month of birth: calves born from January to May tended to be younger at first calving than those born between June and December. Singh et al (1980) also found a year-of-birth effect among Haryana, Gir and another unspecified zebu type cattle in Venezuela.. However, Singh et al (1980) found that neither month of birth nor breed significantly affected age at first calving.

Fertility (calving) rates

The commonest estimate of fertility rate is the percentage of mated or inseminated cows that become pregnant (pregnancy rate) or finally calve (calving rate). However, fertility can also be expressed in other ways. For example, Plasse et al (1975) referred to two measures of fertility: a general fertility rate, which is the ratio of calves born to females of breeding age, expressed as a percentage; and a specific fertility rate, which measures the number of births within a given group or the total fertility rates of females over their reproductive life. Net reproductive rate was given as the extent to which the female calves of one generation survive to reproduce themselves as they pass through calf-bearing age, expressed as the number of female calves that survive per 100 females of breeding age. Fertility rates can also be estimated prior to calving as the percentage non-return rate. This is the number of cows bred that do not come back in heat and are thus assumed to have conceived. This value may be derived at 60, 90, 120, 145 or 200 days after mating (McDowell et al, 1971). Where artificial insemination is employed, fertility rates can be expressed as the number of calves born per 100 inseminations (Wellington et al, 1970). Progesterone assay now makes it possible to determine conception rates as early as 21 days after breeding. It is also ideal for estimating the magnitude of early embryonic losses.

Effect of breed



One of the few studies reporting extensively on the effect of breed on fertility in Africa was undertaken by Cruz (1976) in Zambia. They found that conception rate (averaging 82.5, 78.1 and 75.4% among 675 Angoni, 731 Barotse and 815 Boran cows, respectively) was significantly affected by year but not sire breed, although conception rate was higher in Angoni and Barotse cows when mated to bulls of their own breed. Evidence for dam breeds was also not conclusive. Among the Barotse, dry heifers had higher conception rates than lactating cows, whereas lactating Angoni and Boran cows had higher conception rates than dry cows. Perhaps the most significant observation among the Angoni and Barotse (but not the Boran) was that cows that calved early in the calving season were more likely to conceive during the following mating season than cows that calved late. This was consistent with observations by Bastidas et al (1984) on Ankole and Boran cows in Uganda, and by Aroeria et al (1977) on zebu cattle in Botswana.

Effect of body weight

Alberro et al (1983) observed that Barotse, Angoni and Boran cows that calved were marginally heavier at the beginning and end of the breeding season than cows that did not calve. The last authors calculated that heifers calving at the first and second opportunity averaged 272 ±33 kg live weight, compared with 262 ±27 kg ($P<0.01$) for those bodyweight at time of breeding: Mashona cows that weighed 318-364 kg at mating had a calving rate of 87.5%, compared with 45% for cows weighing 237-273 kg.failing to calve. Duarte et al (1983) also emphasized the importance of cow.

Effects of year and season

Dennis et al(1978) attributed the significant effect of year on calving rate to differences between years in the quantity and quality of forage available. Duarte (1983) found that calving percentage of Africander cross cows in South Africa was positively correlated ($r = 0.84$, $P<0.05$) with rainfall in the previous year. Monthly calving frequency was correlated with previous monthly rainfall records but most of the variation was accounted for by rainfall 10 months earlier in both the highveld (79%) and middleveld (50%). Jochle (1972) also found direct linear correlations between conception rate in Brahman cows and precipitation, pressure and temperature. These findings further emphasize the importance of nutritional effects on fertility.

Calving interval

Calving interval can be divided into three periods: gestation, postpartum anoestrus (from calving to first estrus) and the service period (first postpartum estrus to conception). The following section therefore relates to factors that influence the length of the postpartum anoestrous and service periods. This is sometimes also called the "days open", period and is the part of the calving interval that can be shortened

by improved herd management. The "days open" period should not exceed 80-85 days if a calving interval of 12 months is to be achieved (Malik, 1977). This requires re-establishment of ovarian activity soon after calving and high conception rates. The duration of this period is influenced by nutrition, season, milk yield, parity, suckling and uterine involution. At any time, the effects of one or more of these factors may be confounded. Calving interval has been extensively analyzed and reported. It is probably the best index of a cattle herd's reproductive efficiency. Resumption of ovarian activity in the postpartum period does not necessarily lead to conception and methods of stimulating estrus must be considered in relation to their effect on conception, indirectly, calving intervals. The estimates of the duration of the various phases of the calving interval shown in Figure 12 are based on averages in the literature for cows raised under traditional management.

REFERENCES

Alberro M. (1983) Comparative performance of F1 Friesian x zebu heifers in Ethiopia. Animal Production 37: 247-252.

Aroeria J A D, da Silva H M, Fontes L R and Sampaio I B M. (1977) Age at first calving, length of reproductive life and life expectancy in Zebu cows. Arquivos da Escola de Veterinaria, Universidade Federal de Minas Gerais 29: 301-309 (Animal Breeding Abstracts 46: 32-72).

Bastidas P. Troconiz J. Verde O and Silva O. (1984) Effect of restricted suckling on ovarian activity and uterine involution in Brahman cows. Theriogenology 21: 525-532.

Basu S B. Bhatnagar D S and Taneja V K. (1983) Genetic and phenotypic parameters of lifetime traits in Tharparkar cows. Indian Journal of Dairy Science 36: 207-210.

Bazan O. Munoz H. Deaton O W and Vohnout K. (1976) Reproductive performance of beef cattle in Costa Rica. Memoria, Asociacion Latinoamericana de Produccion Animal 11: 54 (Animal Breeding Abstracts 46: 1-254).

Bazer F W. (1973) A twenty-year summary of heterotic effects on reproduction in Florida cattle. In: M Koger, T J Cunha and A C Warnick (eds), Crossbreeding beef cattle Series 2. University of Florida Press, Gainsville, Florida. pp. 128-134.

Cruz V O. Koger M, Warnick A C and Frankie D E. (1976) Heritability of reproductive characters in Brahman cattle. Memoria, Asociacion Latinoamericana de Produccion Animal 11 25-26 (Animal Breeding Abstracts 46: 1264).

Dennis J P and Thiongane A I. (1978) Effect of intensive feeding on reproductive performance in female Gobra Zebu at the CRZ, Dehra. Revue d'Elevage et de Medicine Veterinaries des Pays Tropicaux 31: 85-90.

Duarte F A M, Valle A, Lobo R B and Bezerra L. (1983) Phenotype and genetic study in reproductive and production characters in the Pitanguieras breed. 2. Calving interval. Agronomia Tropical (Maracay, Venezuela) 30: 325-334 (Animal Breeding Abstracts 53: 1281).

Mahadevan P. Galukande E B and Black J C. (1962) A genetic study of the Sahiwal grading-up scheme in Kenya. Animal Production 4: 337-342.

Malik B S and Ghei G C. 1977. A note on some production characteristics of Gir cattle. Indian Journal of Animal Sciences 47: 587.

McDowell R E. (1971) Feasibility of commercial dairying with cattle indigenous to the tropics. Cornell international Agricultural Development Bulletin No. 21. Cornell University, Ithaca, New York, USA. 22 pp.

Singh R P and Raut K C. (1980) Studies on performance characteristics in cattle maintained under village conditions. Indian Journal of Animal Sciences 50: 619-623.

Wellington K E, Mahadevan P and Roache K L. (1970) Production characteristics of the Jamaica Hope breed of dairy cattle. Journal of Agricultural Science 74: 463 468.