# EFFECT OF AGE, AI, HEAT, BREED, AND MILK ON DAIRY COW CONCEPTION

**Hoka.A.I, Indetie, W.D**

**KARI-National Beef Research Centre, P.O. Box 3840, Nakuru, Kenya**

## ABSTRACT

Reproductive efficiency has major impacts on profitability of livestock operations including commercial dairy herds. For several decades researchers have described reproductive inefficiency in lactating dairy cattle, however, in recent years reproductive inefficiency has become particularly alarming. The understanding of the various factors influencing conception would be important in improving conception rates, leading to increased efficiency of production in dairy cattle. The objective of this study was therefore, to use early non-pregnancy diagnosis (ENDP) to determine the effects of age, artificial insemination number, heat signs, breed of cow and milk production at insemination on conception among dairy cattle. The data obtained was analyzed using SAS. Age of cow, artificial insemination number, type of heat signs, breed and milk production at insemination showed significant ($p< 0.05$) effects on conception rates. Conception increased with increase in age up to 63 to 75 months then decreased whereas conception decreased with increased number of inseminations with the Aryshire cows having the highest conception.

**Key words**: Reproduction, Dairy cow

## INTRODUCTION

Efficiency of production in dairy cattle depends on high conception rates, which will result in increased milk production and the number of calves born over the lifetime of the cow. The more calves born from an individual cow, the better the replacement stock and improved income from sale of surplus calves and increased milk production (Hafez and Hafez 2000).

Heat detection is the single most important problem, which has faced the cattle AI industry since its inception (Geary and Reeves, 1992). The detection is essential to allow for successful application of AI in dairy herds. Most characteristic heat sign among cows is standing heat. It has been estimated that failure to detect oestrus or erroneous detection of oestrus results in an annual loss of about $ 300,000,000 to the dairy industry (Senger, 1994). Cows that are in oestrus display a variety of signs including: discharge of clear mucus from the vulva, tail raising and switching, licking; sniffing and rubbing against other cattle, swelling and reddening of the vulva, frequent bawling, general restlessness and attentiveness to the activities of other cattle and humans, ruffling of rump hair and mild abrasion of rump skin as a consequence of having been mounted, and often a temporary decrease in milk yield ( Hafez and Hafez, 2000).

Progesterone hormone is found body fluids of cows and it increases in amount at pregnancy (Noakes, 1985) and therefore is used to detect pregnancy at 21 days. The understanding of the various factors influencing conception rates would be important in improving dairy farming. The objective of this study was therefore, to determine the Age of cow, artificial insemination number, type of heat signs, breed and milk production at insemination on conception rates of Kenyan dairy cattle.

## MATERIALS AND METHODS

A sample of 459 milking dairy cows comprising Friesian, Aryshire, Sahiwal and their crosses inseminated from the years 2001 to 2006 were used in this study. These are cows that had been inseminated within the said dates within Nakuru district. Exhibition of heat signs was random since there was no synchronization done. Details of each cow included, AI service number, age, milk production at insemination. Milk samples were collected (10 ml) from each cow on days of insemination, 12 and 23 days after insemination. Milk for day 0 was to determine the timeliness of the AI, day 12 milk was used to determine cyclicity whereas the milk sample of 23 day after insemination was used to determine early non-Pregnancy diagnosis using radioimmunoassay Federation of African organization/Internation atomic energy agency (FAO/IAEA, 1999) technique to indicate the progesterone profile; this is a hormone used to maintain pregnancy in all species

and rectal palpation was done at day 90 to confirm emptiness or pregnancy.

## RESULTS AND DISCUSSIONS

Age affected conception with 68% conception occurring among cows that were 63-75 months old and 20% conception occurred among cows that were 89-101 months old (Fig 1**).** There was a positive linear relationship between age and P4 level at 10 days after AI. The relationship showed P4 levels decrease with age ($P<0.05$). Age had a negative correlation ($r = -0.67$, $P< 0.05$) with progesterone levels at day 20 after insemination, older cows had depressed levels of P4 at day 20 after AI. The results suggest that older cows may have had normal cyclicity with lower P4 values and could not maintain the corpus luteum after 10 days due to lack of conception. The decrease in P4 levels at day 20 suggested that older cows had depressed P4 levels after AI which could not support conception. These findings agreed with observations made by Hafez and Hafez, (2000) who found a reproduction peak potential in dairy cattle occurring between ages 60 and 84 months.

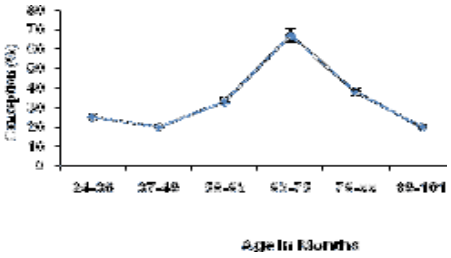


**Fig.1 Effect of Age on Conception**

Number of artificial insemination affected conception. Conception decreased with increased number of artificial insemination done. The highest conception (40%) occurred at the single insemination and the lowest conception (5%) occurred at the 5th insemination (Fig.2).

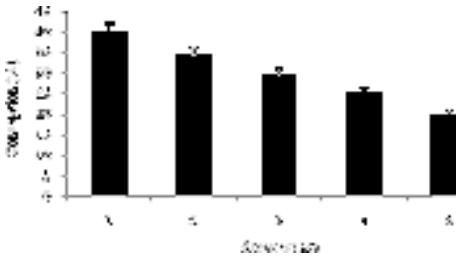
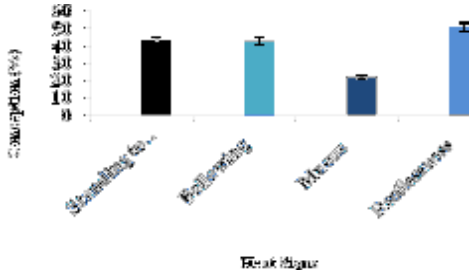


**Fig.2 Effect of AI Service Number on Conception**

Heat signs affected %conception.There were four outstanding heat signs they included bellowing, standing to be mounted and restlessnes. Mucuc discharge alone gave the lowest conception (Fig.3). This finding agreed with the finding of French *et al*. (1989); Geary and Reeves (1992) and Hafez and Hafez (2000) who reported that standing to be mounted is a very significant sign among cows that are bulling and that it is the right time for successful insemination.



**Fi g 3 Effect of Heat Signs on Conception**

There was significant difference in %conception among different breeds with Aryshire having the highest conception and the crosses having the lowest conception. However there was no significant difference in conception between Friesians and Sahiwal breed of cows (Fig.4).

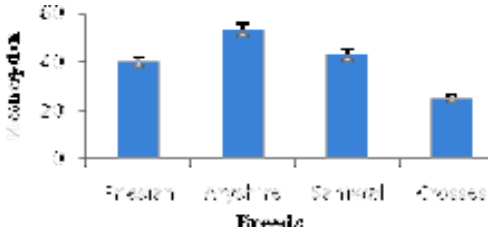


**Fig.4 Effect of breed on conception**

Milk influenced conception with cows which produced lower than 15 litres/day having 48% conception whereas those which produced above 15 litres had 38% conception rates; this could be due to nutrients being diverted to milk production rather than reproduction as indicated with increased silent heats among the high yielders and non cyclicity (Figure 5) These findings are similar to those of Butler *et al.,* (1981) and Van Arendonk *et al*., (1991) who showed a negative nutrient balance for high yielding dairy cattle, but differed with the results found by Zarek *et al*., (1995).who reported that milk did not affect post partum ovulation.

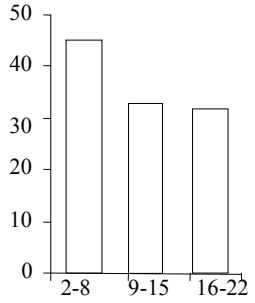



**Figure 5: Effect of milk production on conception**

## CONCLUSIONS

- Age affected conception with conception increasing with up to 63-75 months
- Conception reduced with increased repeat inseminations.
- Heat signs and type of mucus affected conception.
- Breed of cows affected conception
- High milk yielders producing 20 liters per day had low conception rates.

## RECOMMENDATION

- Breeding cows that are above 89 months should be culled
- Cows producing above 15 litres of milk/day should be supplimented with nutritios feeds
- Aryshire are recommended for fast breeding

## REFERENCE

[1] Butler, W.R., Everett, R.W. and Cappic C.C. (1981). The relationship between energy balance, milk production, and ovulation on post partum Holstein cows. *Animal Science, 53:*742-749.

[2] Hafez, E. S. E. and Hafez, B. (2000). *Reproduction in Farm Animals.* 7th Edition. Hafez and Hafez (eds) Lippincott Williams and Wilkins, Pp55-172.

[3] Geary, T.W. and Revees J. J. (1992). Relative importance of vision and olfaction for detection of oestrus by bulls. *Animal Science,* 70:2726-2731.

[4] Senger, P.L. (1994). The oestrus detection problems, new concepts, technologies and possibilities. *Dairy Science* 77:2745-2753.

[5] Noakes, D. (1985). Pregnancy diagnosis in cattle. *Practices (March issue*): 46-51.

[6] FAO/IAEA (1999). Bench Protocol *for RIA* 'Self-coating technique.

[7] Statistical Analysis System (2001). *SAS Institute Inc*. Ver. 8.2. *Cary,* North Carolina.

[8] Van Arendonk, J. A. M., Njeuwhof, G. H., Vos, H. and Korver, S. (1991). Genetic aspects of feed intake and efficiency in lactating dairy heifers. *Livestock Production Science,* 29:263-275.

[9] Zurek, E., Foxcroft, G. R. and Kennelly, J. J. (1995). Metabolic status and interval to 1st ovulation in postpartum dairy cows. *Dairy Science,* 78:1909-1920.

[10] French, J. M., Moore, G. F. Perry, G. C. and Long, S.E. (1989). Behavioural predictors of oestrus in domestic cattle, *Bos taurus*. *Animal Behavio,* 38:913-919.