

# EVALUATION OF FERTILITY RATE IN FRIESIAN AND WHITE FULANI (BUNA II) BREEDS OF CATTLE FOLLOWING ARTIFICIAL INSEMINATION

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(Received 7 September, 2005; Revision accepted 31 October, 2005)

## ABSTRACT

The study was carried out to evaluate the fertility rate of white Fulani (Bunaji) and Friesian breeds of cattle following artificial insemination (A. I.). Artificial insemination was performed following Oestrus synchronization using prostaglandin F<sub>2a</sub> (PGF<sub>2a</sub>) in 368 white Fulani and 230 Friesian cows at West Africa Milk Company (WAMCO), Vom Jos, Plateau State over a period of three years (January 1989 to December 1991). Frozen semen of a Friesian bull imported from Holland was used for the A. I. The cows were monitored for pregnancy by measuring the serum and or milk progesterone level and the numbers of pregnant and non-pregnant cows recorded. The fertility rates in the inseminated cows were 89% and 91% in White Fulani and Friesian breeds respectively. The implications of the result on livestock production in Nigeria are highlighted.

**KEY WORDS:** Fertility rate, White Fulani, Friesian, Breeds, Artificial insemination

## INTRODUCTION

Artificial insemination (A. I.) is the breeding method in which semen is collected from a proven normal healthy bull (sire) with desirable traits, processed and stored in a cool condition and thereafter deposited into the female reproductive tract (cervix) at oestrus by means of an inseminating pipette making her pregnant without direct contact with the bull (Hafez, *et al* 1987). Oestrus synchronization in cows using prostaglandin F<sub>2a</sub> (PGF<sub>2a</sub>) has been carried out and reported, research efforts thus attempted to improve the reproductive efficiency of dairy cattle by inducing oestrus with PGF<sub>2a</sub> (Dolezel *et al*, 2002 and Lucy *et al* 2002).

A.I. has long been acknowledged as a powerful tool for genetic improvement in cattle in the developed nations (Hunter, 1985). The world first recorded use of A. I. dates back to 1780 in Italy when a bitch was inseminated to produce offspring by this technique for use on farm animals. By 1930, successful results were achieved with cattle and sheep (Webb, 2003). By 1963, the use of liquid nitrogen for storing semen was also developed. This means that, with careful handling semen could be stored for longer period (Oyedipe, 1984). Semen could be stored for up to 6-25 years without losing viability (Hafez, 2000 and Hunter, 1985). In 1937, a Danish Veterinary Doctor skillfully developed the recto-vaginal or cervical fixation method of A. I. for cows. This involves manual manipulation of the cervix via the rectum by using the left hand to guide the inseminating pipette deep into the middle of the cervix or as far into the body of the uterus. This technique is fast, very effective and gives higher conception rate (Webb, 2003, Scott, 2002).

The first record use of A. I. in Africa was in Kenya; in 1935 by Dr J. Anderson. He reported 733 pregnancies from A. I. on a farm in Kenya. The technique has been largely used to control reproductive diseases in cattle in Kenya (Oyedipe, 1984 and Patrick *et al*, 1989). The first successful recorded A. I. in Nigeria was in 1945 by Armour and Sainsbury at the National Veterinary Research Institute (NVRI) Vom, in 1952. The NVRI

Vom imported semen in ampoules from milk marketing board in England. The first and successful use of A. I. at WAMCO was in 1989. Today A. I. is the main breeding method employed at WAMCO. The most promising approach to the improvement of the reproductive rate and genetic potential of Friesian and white Fulani breeds at WAMCO dairy farm is by technique of A. I. The use of A. I. results in faster improvements in the traits of economic importance because of increase use of genetically superior semen. It also assists in the control of reproductive diseases such as vibriosis, trichomoniasis, leptospirosis and brucellosis (Webb, 2003). Several attempts were made by various states of the federation and individual herdsmen to develop and encourage the use of A. I. in Nigeria, however only little progress has been made due to poor planning, lack of technical know-how, lack of funds; illiteracy, lack of facilities and some inhibiting factors like religious, cultural and traditional beliefs that consider the act as an immoral practice that should be done away with in the society.

This study is aimed at evaluating the fertility rate of White Fulani and Friesian breeds of cow at WAMCO using A. I. for breeding. The result, is hoped will go a long way towards the development and improvement of the cattle industry in Nigeria.

## METHODS

Data of A. I. for three years (January, 1989 to December, 1991) were collected from the records of West Africa Milk Company (WAMCO), Vom, Jos, Plateau State. The record shows that during the period, WAMCO carried out A. I. on a total of 368 White Fulani cows and 230 Friesian cows raised under the same condition. A. I. performed during the period was carried out in three phases based on the availability of cows for synchronization and subsequent A. I.: Phase 1: 175 white Fulani and 33 Friesian were inseminated between January to February, 1989, Phase 2: 139 White Fulani and 47 Friesian were inseminated between June and December, 1990, and phase 3: 54 White Fulani and 150 Friesian were

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**Table I. White Fulani Breed.**

Period of A. I	No. of cows inseminated	No. of cows pregnant	Pregnancy rate (%)
Jan. - Feb. 1989	175	168	96
June - Dec. 1990	139	114	82.01
June - Dec. 1991	54	47	87.04
Total	368	329	89

**Table II. Friesian Breed.**

Period of A. I	No. of cows inseminated	No. of cows pregnant	Pregnancy rate (%)
Jan. - Feb. 1989	33	33	100
June - Dec. 1990	47	40	85.11
June - Dec. 1991	150	136	90.67
Total	230	209	91%

inseminated between June and December 1991.

A. I. was performed following Oestrus synchronization using prostaglandin F<sub>2a</sub> (PGF<sub>2a</sub>) (Dolezel *et al.*, 2002). Frozen semen of a Friesian bull imported from Holland was used for the A. I. At WAMCO, the insemination was performed using the recto-vaginal technique. The semen was removed from the liquid nitrogen using a forceps and was thawed in a water bath to a temperature of 37°C then loaded to the inseminating pipette. The left hand was gloved and lubricated with paraffin. The tail of the cow was raised to expose the anus. This was followed by gentle insertion of the gloved left hand into the rectum for the manipulation of the reproductive tract (cervix). The right hand was then used to insert the inseminating pipette through the vulva opening, which invariably was assisted by downward pressure of the forearm in the rectum. This caused the lips of the vulva to separate sufficiently to allow the instrument come in contact with the vaginal lining. The inseminating pipette was introduced freely and gently with the tip pointed slightly upward into the vestibulum. The hand in the rectum was used to locate the cervix. This was done by following the vagina upward; the thumb was placed at the opening while grasping around the cervix with the other finger. The cervix was pushed forward so that the folds of the wall of the vagina were straightened out. The pipette was then passed horizontally into the cervix with the hand in the cervix guiding and directing to the position of the cervix. The inseminating pipette was inserted up to two thirds of its length into the cervical canal and the semen deposited (Webb, 2003 and Scott, 2002). The inseminated pipette was then slowly withdrawn. Similar procedure was repeated in all the cows inseminated during the period of study. The cows were then monitored for pregnancy by measuring the serum and or milk progesterone levels (Payne and Wilson, 1999) and the numbers of pregnant and non pregnant inseminated cows recorded. Data obtained from the records were collated and analyzed to determine the fertility rates of White Fulani and Friesian breeds of cattle using percentage.

## RESULTS AND DISCUSSION

Results of the study are presented in tables I and II below. A total of 368 White Fulani and 230 Friesian breeds of cows were inseminated following oestrus synchronization between January 1989 and December 1991. Three hundred and twenty nine (329) 89% and two hundred and nine (209) 92% of the White Fulani and Friesian breeds respectively inseminated were confirmed pregnant. The rate of pregnancy varies from 82 to 100% among the groups in both breeds. The results

showed that the fertility rate in both White Fulani and Friesian breeds following A. I. is high ranging from 82- 100%. The average fertility rates were 89% and 92% for White Fulani and Friesian breeds respectively following A. I. after synchronization. On the average the fertility was higher (3%) in the Friesian breed than the White Fulani breed. The slight variation in pregnancy rates even for the same breed in different groups during the study could be due to seasonal variation. Seasonal variation affects the weather condition such as temperature, humidity and the availability of forages or feeds which is directly proportional to conception rate in farm animals (Payne and Wilson, 1999). Other reasons that could cause the variation include error in heat detection, diseases, semen handling and time of insemination. However future research could provide a better understanding of the causes of the slight variation in the fertility rate between White Fulani and Friesian breed by considering genetic and other environment factors related to reproductive performances in these breeds of cattle.

## CONCLUSION

In conclusion, both the Friesian and the White Fulani breeds of cattle used in the study, gave rise to acceptable fertility rates. Therefore the use of A. I. in Friesian (exotic) or White Fulani (indigenous) breeds will be efficient at improving reproductive efficiency in cow. White Fulani crossed with Holstein breed has also been found to produce a more productive milk offspring in Nigeria (Payne and Wilson, 1999). The indigenous White Fulani breed could therefore be successfully used for A. I. to save the cost and other problems associated with the importation of exotic breeds more so as the White Fulani has been found to be a triple purpose (high milk yield, good beef producer and fairly good draft animal) breed (Payne and Wilson, 1999, Asuquo, 2002). The findings in this study is therefore hoped to go a long way in revitalizing and boosting the livestock industry in Nigeria.

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