

TIMED FIXED INSEMINATION: CHALLENGES AND SOLUTIONS TO IMPROVE THE EFFICIENCY

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Abstract

The aim of this study was to consider practical and operational aspects for the correct implementation of programs of time fixed artificial insemination, emphasizing aspects such as organizational structure in the property and recently described pharmacological resources. Key-words Bovine, artificial insemination, fixed-time

Introduction

The Brazilian cattle herd has more than 200 million animals (MAPA, 2006), mainly (80%) from Nelore or crossed with this breed, being the largest commercial herd in the world. Meanwhile, the rates of production are low because of low results of reproductive efficiency.

The high proportion of cows in anoestrus at the beginning of the breeding season is a common condition in *Bos taurus indicus* and it hardly affects the reproductive efficiency, causing serious losses in Brazilian herd (BARUSELLI *et al.*, 2004). The low production of pasture coincide with periods of high nutritional requirement, as the last trimester of pregnancy and the beginning of the postpartum period, making conditions to anoestrus (DODE *et al.*, 1989). This situation does not allow the obtainment of pregnancies in the first 75 days of postpartum, making impossible an interval of 12 months between births (SHORT *et al.*, 1990).

The purpose of this review is to discuss the main practical aspects related to implementation and efficiency of the TFAI in cattle.

Conventional artificial insemination (AI)

The main advantages of artificial insemination (AI) are the genetic improvement of commercial livestock, promoting better economic results. However, there are limitations in conventional AI programs that result in conception rates from 20 to 30% in the first half of the breeding season (BARUSELLI *et al.*, 2002). Among the factors related to low conception we should emphasize estrus detection at postpartum (BARUSELLI *et al.*, 2004; MARQUES *et al.*, 2003a). Several studies have shown that Nelore cows expressed estrus predominantly at night (30%) and with shorter duration (11 hours) regarding females *Bos taurus* (PINHEIRO *et al.*, 1998; MIZUTA, 2003). Several strategies have been reported in the literature to reduce factors related to postpartum anoestrus, including the maintenance of body condition in the pre-partum, protocols for synchronization of ovulation and removal of breast feeding effects (SHORT *et al.*, 1990; YAVAS and WALTHON, 2000). Protocols of fixed time artificial insemination tend to control the growth of follicular waves, regulate the corpus luteum function and the time of ovulation (MACMILLAN and BURKE, 1996). Currently in Brazil, the mainly hormones used are progesterone, prostaglandins and its analogues and estradiol, in addition to the equine chorionic gonadotropin (eCG).

Organization of properties to implement synchronization programs

Organization of farms for using FTAI programs needs some basic requirements such as adequate health and nutritional management, appropriate facilities, accuracy on animal identification and, very important, good employees. Some experiments have been conducted with the aim of analyzing the pregnancy rates according to some variables in the steps of the FTAI protocols.

The body condition score (BCS) is used to measure the energy reserves of beef cows in different stages of production (SHORT *et al.*, 1990). The effects of body condition score on the pregnancy rates in FTAI of cows during the post-partum period were extensively studied. Baruselli *et al.*, (2004) obtained low pregnancy rates (< 50%) in animals with BCS£3.0. This same study noted an increase in the pregnancy rate using eCG in animals with BCS between 2.5 and 3.0. Recently Ayres *et al.*, (2007) found the interactions of BCS and the post-partum period on pregnancy rates in 887 cows submitted to IATF. These authors observed that the eCG application is needed in cows with 30 to 59 days post-partum, independent of body condition score (2<ECC>3.5).

In a work conducted in the city of Brasilândia-MS with 2279 lactating Nelore cows, there were compared the rates of losses of ear implant impregnated with Norgestomet (Table 1). There was a difference of 7%, demonstrating the importance of well prepared employees in FTAI services.

Table 1. Rate of loss of Norgestomet implant, according to the responsible technician for inserting in Day 0, Brasilândia-MS, 2006

Technician	N	Rate of losses (%)
1	1561	0.06 (1/1561)
2	156	7.7 (12/156)
3	562	0.17 (1/562)

The quality of frozen semen may highly interfere with the efficiency of biotechnologies as the FTAI. Aiming to evaluate the effect of semen on the FTAI pregnancy rates, Marques et al (2004) conducted a study comparing the pregnancy rates 585 lactating Nelore cows submitted to FTAI with three bulls (Table 2). It was observed in this study that the quality of semen may compromise the pregnancy rates, because there was a difference of 13 to 25%.

Table 2. Conception rates of Nelore lactating cows according to the semen used. Lavínia-SP, 2004.

Bull	N	Conception Rate (%)
A	118	44.9 (53/118) ^a
B	248	69.4 (172/248) ^b
C	219	57.1 (125/219) ^c

P<0.05

Other evaluated aspects were the conception rates of 434 cows that were submitted to IATF with different sets frozen of semen from the same bull (Table 3). Therefore, besides the previous semen evaluation, the IATF must contemplate the semen quality not only of different bulls, but different sets as well.

Table 3. Conception Rate of Nelore lactating cows submitted to IATF with different sets from of frozen semen from the same bull, Brasilândia-MS, 2006

Batches	N	Conception Rate (%)
1	161	64.2
2	89	62.9
3	87	51.7
4	96	46.4

In another experiment it was analyzed the effect of the inseminator on the conception rates of 2954 Nelore lactating cows, submitted to FTAI in the region of Brasilândia, Mato Grosso do Sul (Table 4).

Table 4. Conception Rate of Nelore lactating cows submitted to IATF according to the inseminator, Brasilândia-MS, 2006

Inseminator	N	Conception Rate (%)
1	213	56.8
2	291	50.2
3	390	57.1
4	505	60.2
5	870	56.6
6	185	68.1

Final Considerations

With the data exposed above it is necessary to consider the assistance of an expert technician, appropriate facilities and good management requirements for the adoption and effective use of FTAI. This biotechnology is largely presented as a feasible alternative to increase the conception rates in the first half of the breeding season and consequently raise the reproductive efficiency.

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