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Full Length Research Paper

Production and transfer of embryos in Algerian "Cheurfa" bovine breed

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This work has permitted to test the response of the local cattle Cheurfa for a pFSH superovulation treatment based on administration of 40 mg pFSH (LH/FSH 40%), at a rhythm of 2 injections every 12 h between J10 and J13 of the oestrus cycle associated to injection of prostaglandin synthesis "Prosolvin®" at the 3rd day of the treatment. Two inseminations were carried out at 12 h interval after observed oestrus. The embryos were collected at J7. With four tests carried out, the average number of corpus luteum and collected embryos obtained were respectively 7.5 and 5 per cow. The number of transferable embryos was 2.33 per cow, with a viability rate of 46.66%. Five fresh embryos were transferred in recipients improved breed from the embryos obtained. The pregnancy rate obtained was 60. 0% with 3 born calves Cheurfa type (2 male and 1 female).

Key words: Superovulation - embryo - transfer - cattle – local.

INTRODUCTION

The conservation of the bovine races autochtones is actually facilitated by the use of biotechnologies of the reproduction. Their application remains problematic, in the African continent, have regard to the need for adaptation of the treatments of super-ovulation and col-lection imposed by the anatomical and physiological characteristics (Chicoteau, 1987, 1991).

A particular interest for the fast multiplication of a pre-selected core was expressed in Morocco by the installation of a programme of transfer of embryos (Elaidi et al., 1996a et b).. In other countries of Africa, the adap-tation of the treatments of superovulation and harvest was used at certain races autochtones for the conserva-tion (Bianchi et al., 1986; Jordt et al, 1986; Jordt et Lorenzini, 1990; Cristofori et al, 2001).

Algerian indigenous populations of bovine are grouped under the name "Brown breeds of atlas" or "local breed" (Abdelguerfi, 2003). This local breed of bovine has given birth to some shoots, identified on the basis of geogra-phical location, like: "Cheurfa", "Guelmoise", Sétifienne" and "Chélifienne".

Since many crosses were made in this local breed, so we can ask on the still existence of pure types of this local cattle population?

The "Cheurfa" breed represents a significant genetic entity with its hardiness and its adaptation to local conditions difficulties. It represents only 5% of all the local breeds, of about 700,000 head (ITEBO, 1997). Particular attention to this variety of local cattle must be made for its conservation and for the improvement of its reproductive performances. The production of embryos in vivo fits perfectly into this framework.

The present work consists in testing the response of "Cheurfa" cows to treatments of superovulation and in vivo embryo transfer.

MATERIALS AND METHODS

This study conducted during the period from April 2004 to April 2005, was focused on 09 cows whose 04 donors were selected on their phenotypic characteristics, from a nucleus of bovine "Cheurfa" CL breed, originating from east of Algeria (cradle of this race). Donors (all primiparous) and recipients, pluriparousCL females of CLdairy breeds, have shown no affection of their genital tract, have a higher postpartum period to 90 days and a score body note average of 3.

Induction and synchronization of donors and recipients heats was conducted by laying underground Skin implants of Norgestomet "Crestar" ®, combined with an injection of 2 ml with oil solutions (3 mg of Norgestomet and 3, 8 mg valérate of oestradiol) IM. On the 10th day, the implant is removed and an injection of Luprostiol "Prosolvin ®" and "PMSG Folligon ® is used to induce luteolysis, and to ensure follicular growth (Grimard et al., 2003; Mialot et al.,

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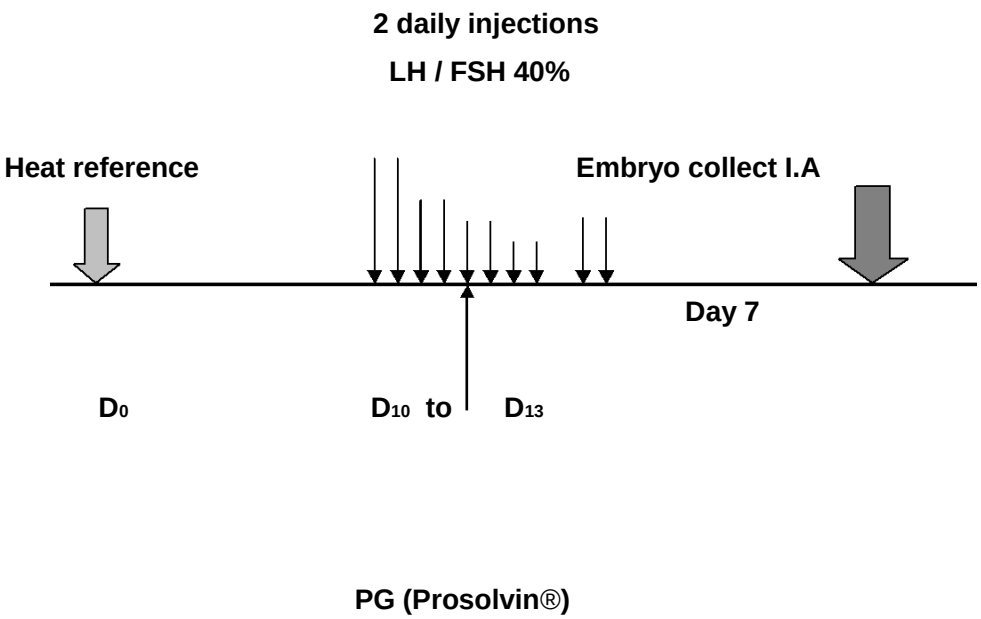

Figure 1. Superovulation treatment protocol (Nibart, 1991).

1998).).

The treatment of superovulation (Figure 1) was carried out with 40 mg of pFSH (LH / FSH 40%) (FMV ULg PhR), at the rate of 2 injections, at 12 h interval, with decreasing doses, at day 10 of the estrous cycle compared with heat reference. On the third day of treatment, an injection of an analogue of prostaglandin "Prosolvin ®" has been administered. A double insemination, using frozen semen local “Cheurfa” breed, was taken 12 h apart on observed estrous.

The response to treatment was estimated by the interval PG-onset of estrous and the number of corpora lutea present on the ovaries after palpation and transrectal ultrasound (Toshiba ultra-sound probes 5 MHz linear). Figure 2

The cervical collect of embryos was conducted at the 7th day after the first I.A, with a 2 way Folley probe. Each uterine horn is flushed with an adapted volume of PBS. The embryos were first collected and then morphologically analyzed and classified with a binocular microscope (Nikon) and a microscopic (Hund) (Elsden et al., 1978). Transferred embryos were previously washed in a conservation media (IMV ZT 454), and then packed in straw of 250 µl.

The embryo transfer is realized in cows presenting a corpus luteum on one of the ovaries; the embryo is filled in the ipsilatéral uterine horn of the corpus luteum, with a transfer pistol, protected by a transfer jacket, through natural pathways.

The diagnosis of pregnancy has been achieved by transrectal palpation, and confirmed two to three months later.

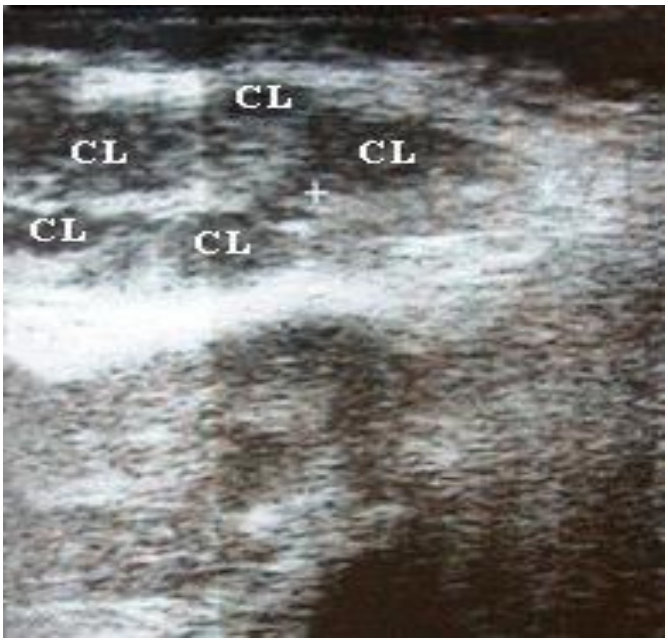

Figure 2. Corpora lutea present on superovulated ovary. CL: corpora lutea.(Toshiba Echography SONOLAYER-L SAL32-B, linear sound of 5 MHz)

RESULTS AND DISCUSSION

Results of superovulation treatments, reported in Table I, show that all donors came into estrus in a mean interval, PG- onset of estrus of 39.5 h after Luprostiol injection, with an average number of corpora lutea per cow, present on the day of collect of 7.5 Our results show that “Cheurfa” breed donors responded to treatment of super-ovulation and have no variability in the time of onset of their estrous. The mean interval PG-early observed estrus of 39.5 h, is compared to that achieved by Dalton et al. (2000).

The average number of corpora lutea obtained is low compared to that of selected meat and milk breeds (Chupin and Procureur, 1983; Donaldson, 1984; Chupin, 1988) . Compared with other local breeds in Africa, it is close to those obtained by Chicoteau (1989) and Bianchi

Table 1. Results of responses to superovulation treatments.

Donors	Mean Interval PG – onset of estrous (h)	Mean number of corpora lutea / cow
4	39.5 ± 3.26	7.5 ± 3.26

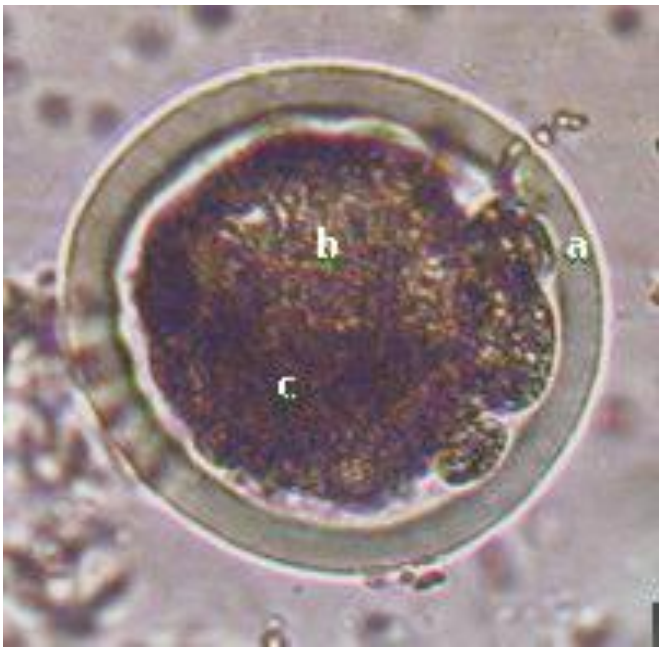

Figure 3. Early Blastocyste (x 100).
a : zona pellucida, b : blastocoel, c : Inner cell mass.

Figure 4. Morula stage (x 100).
a : zona pellucida, b : blastomere.

et al. (1986), which were respectively of 6.5 and 6.9, with a lowest dose of pFSH for “Baoulé” cows breed. However, it is higher than those reported by Diop et al. (1994) and Jordt et al. (1986), which were respectively of 5.06 and 4.5, with a lowest dose of pFSH for “N’dama” cows breed. Elaidi et al. (1996a) have obtained a biggest response to treatment for “Oulmes Zaer” cows breed, when pFSH dose was high. Indeed, the work of Elaidi et al. (1996a and b) show that the number of corpora lutea obtained with a dose of 32 mg is low compared to that obtained with a dose of 40 mg (7.2 vs. 10.5). However, the response of superovulation seems to be directly proportional to the used dose, until an optimal value, beyond which the response decreases as reported by Kanitz et al. (2002).

Results obtained from the three collected cows on the four treated and reported in Table 2, indicate that the average number of embryos obtained per cow is of 5.0.

Evaluation of the quality of embryos showed an average number of embryos transferred per cow of 2.33 (Figure 3 and 4), at a rate of viability of 46.66.

The number of transferable embryos obtained (2.33) is low compared to that of selected meat and milk breeds (Donaldson, 1984; Breuel et al. 1991; UNCEIA, 2001; Lafri, 2002; Hasler, 2003). Compared with local breeds in Africa, this number is similar to that obtained from the “N’dama” breeds (2.2), with a single dose of pFSH (Jordt and Lorenzini, 1990). In contrast, it is lower to that achieved with “Oulmes- Zaer”, with 3.2 embryos (Elaidi et al., 1996a). However, it is higher from those reported by Chicoteau (1989), Jordt et al. (1986) and Diop et al. (1994) obtained from “Baoulé” breeds 0.88 and 0.63 embryos, and from “N’dama breeds, 1.8 and 1.4 embryos respectively.

These differences appear to be in relation in part to the dose effect and / or the race effect. Results obtained by Kanitz et al. (2002), Murphy et al. (1998), Escouflaire et al. (1989), Lerner et al. (1986) and Donaldson and Ward (1985), have shown that the number of ovulations increases with the dose of FSH to an optimal dose beyond which response to treatment decreases. Donaldson (1984) and Breuel et al. (1991) have observed that certain races respond more favorably to treatment of superovulation than others.

The 46.66% viability rate obtained is similar to those observed by Elaidi et al. (1996a and b) in “Oulmes Zaer” breeds, of 53 and 48.7%.

The pregnancy rate obtained by transfer of 05 fresh embryos of about 60%, was satisfactory compared with those reported by Hasler (2001, 2004) of 68.3 to 77.1%; Chagas et al. (2002) of 58.7% and Lakhdissi et al. (1996) of 65%.

Conclusion

Preliminary results obtained in this study indicate that cows of “Cheurfa” breeds respond to the superovulation treatment.

Table 2. Results of collected embryos / cow.

Cows		Embryos			
Treated	**Collected**	**Collected**	**Not fertilized**	**Degenerated**	**Transferred**
4	3	5	2	0.66	2.33

The performance, although small, as compared with those of selected breeds of cattle, is close to some breeds of indigenous African cattle. For better results, further works are needed to determine the optimal dose to use in our local cattle breeds.

Obtained embryos can be frozen and conserved in a bank of embryos; they can even be used in certain manipulations of previously selected nucleus, in order to perform the cost of transferred embryos.

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