

## **EFFECT OF INDUCING CALVINGS ON CALF BIRTH WEIGHT. (1)**

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### **SUMMARY**

Thirty eight Alentejano (AL) pregnant beef cows carrying 20 ALxAL calves from A.I. and 33 crossed calves from IVF-IVM embryo transfer (ET) were allowed to calve naturally (NC). Seventeen AL cows (IC) carrying 13 ALxAL calves from A.I. and 8 crossed calves from IVF-IVM embryo transfers were induced to calve as follows: Group IC-I (n=8) receiving implants containing 3 mg of norgestomet in both ears, 3 mg of norgestomet + 5 mg of oestradiol benzoate, 25 mg of PGF2 $\alpha$  IM and 45 mg of dexametasone all i.m., on day 256 of gestation; group IC-II (n=9) receiving the same treatment on day 264. Implants were removed on days 264 and 268 in groups IC-I and IC-II, resulting in a retention period of 7 and 4 days, respectively. The NC groups of cows produced 15 sets of twins (39.5%) vs. 4 sets of twins (23.5%) in the IC group. Single and twin ALxAL calves and single calves born from ET were significantly lighter in IC vs. NC groups. In NC groups, single calves were significantly heavier than twins. Gestation length was significantly reduced in IC vs. NC cows. Single gestations were significantly longer than twin ones in NC groups of cows. In the IC-I group, 3 out of 8 cows calved before the day of implant removal (mean gestation length = 264.78 days; range = 263 - 268 days). In the IC-II group, 7 out of 9 cows calved within 48 hours next to implant removal, the two remaining cows calving by 72 and 96 hrs after. In the NC group, calves born from ET presented a stillborn rate of 26.7% and 27.6% for singles and twins, respectively. No calf mortality was observed in the IC group due to problems related with early calving induction or calf birth weight.

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### **INTRODUCTION**

Bovine frozen embryos (IVF/IVM) produced by in vitro fertilization of oocytes collected at abattoirs from slaughtered crossed-beef females, are being transferred to recipient beef cows of the Alentejano portuguese breed under the contract no. AGRE 0018 of the EEC-ECLAIR research program.

The induction and viability of twin gestations by transferring two embryos or by combining AI with embryo transfer (ET) is also being researched.

A high rate of stillborn calves was found to be associated with heavy calves at birth and prolonged gestations.

It was reported that Simental calves born each day after the average of gestation length are heavier around 0.5 Kg, and calving assistance increases by around 1% (1).

The purpose of this particular research was trying to overcome calf mortality by reducing calf birth weight and gestation length through early induction of calvings.

### **MATERIALS AND METHODS**

The recipient Alentejano beef cows (AL) used in this experiment were kept on a lowland natural pasture. Only adult cows were used to receive IVF/IVM thawed embryos. The embryos were produced by the OVAMASS Laboratory using its own in

vitro developed techniques. Twin gestations were induced by transferring two embryos or by artificial insemination (AI) plus one embryo transferring 7 days after synchronized heats.

Genotype of embryos arose from in vitro fertilization of oocytes collected from crossed beef cows at slaughter houses with semen of Simental or Charolais bulls. Artificial insemination using Alentejano semen of an individual bull was performed in those cows receiving one embryo (ALxAL products).

In one group (NC) pregnant cows were allowed to calve naturally (n=38).

In a second group (IC) 17 pregnant cows were treated for inducing parturitions with a method modified from that proposed by Janszen et al. (2), as follows:

- IC1 (n=8) receiving two Norgestomet implants (3 mg) on day 256 of gestation plus a Norgestomet (3mg) and oestradiol benzoate (5mg) association, 25 mg of PGF2 alfa and 45 mg of Dexametasone, all i.m.. Implants were removed 7 days later (264 G);

- IC2 (n=9) receiving the same treatment on day 264 of gestation but the implants were removed 4 days later (268 G).

Calf birth weights were compared between AI and ET products considering the calving group (NC vs. IC, and twin vs. single gestations) by analysis of variance and least significant differences.

Regressions of calf birth weight on gestation length were considered for single calves resulting from AI and ET.

Mortality of calves were considered up to 48 hours after birth.

## RESULTS AND DISCUSSION

Results of calf birth weight and gestation length concerning breed and parity for NC or IC groups are shown in tables 1 and 2.

Table 1. Differences on birth weight of calves born from AI (ALxAL) or ET (beef crosses), after natural (NC) or induced calvings (IC).

	(n)	Mean (kg)	LSD for mean	Significance	Mortality (%)
AI products:					
NC Singles	08	38.50	33.9 - 43.1	a	12.5
Twins	12	32.33	28.6 - 36.1	b	0.0
IC Singles	08	27.75	24.5 - 31.0	c	0.0
Twins	05	23.40	19.3 - 27.5	d	0.0
ET products:					
NC Singles	15	54.37	51.6 - 57.2	a	26.7
Twins	18	43.39	40.8 - 46.0	b	27.8
IC Singles	05	38.80	33.9 - 43.7	b	0.0
Twins	03	37.00	30.7 - 43.3	b	0.0

For AI and ET categories, means with different letters are significantly different (ANOVA-LSD; P<0.001)

Calf birth weight was significantly reduced by inducing parturition in single gestations (AI and ET products). Also, mortality rate was succesefully abolished in IC calves as compared with around 27% of stillborns observed in NC ET-born calves. Gestation length in twins and singles was significantly reduced by inducing calvings.

Table 2. Differences on gestation length of Alentejano cows carrying singles or twins, after natural (NC) or induced calvings (IC), (AI or ET products)

	(n)	Mean (days)	LSD for mean	Significance
AI products:				
NC Singles	08	287.75	285.7 - 289.8	a
Twins	12	281.10	279.4 - 282.8	b
IC Singles	08	266.25	264.2 - 268.3	c
Twins	05	266.80	264.2 - 269.4	c
ET products:				
NC Singles	15	290.60	288.9 - 292.3	a
Twins	18	282.10	280.5 - 283.6	b
IC Singles	05	269.80	266.8 - 272.8	c
Twins	03	268.00	264.2 - 271.8	c

For AI and ET categories, means with different letters are significantly different (ANOVA-LSD;  $P < 0.001$ )

Regressions of birth weight on gestation length (Figure 1) were computed for single calves born either from AI ( $Y=0.488 X$ ,  $r=0.81$ ,  $P < 0.001$ ) or ET ( $Y1=0.764 X$ ,  $r=0.60$ ,  $P < 0.01$ ). Gains in birth weight of 0.488 Kg per day of increase in gestation length for Alentejano calves, are similar to those reported by Burfening et al. (1) for Simmental calves. Similarly, a gain of 0.764 Kg per day was observed in calves born from ET.

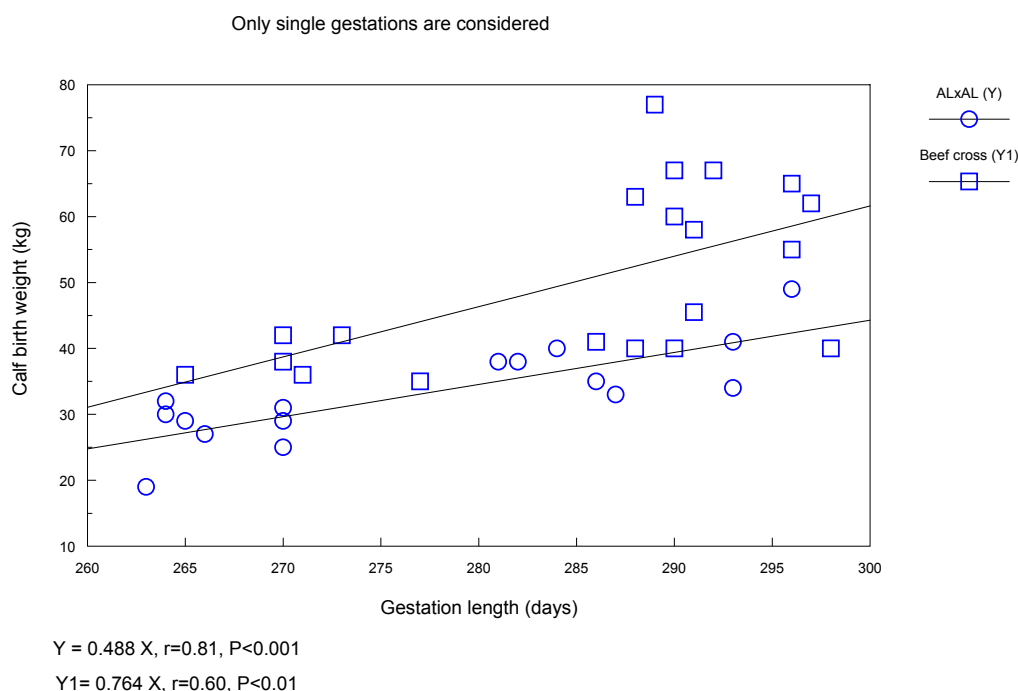


Figure 1. Regressions of calf birth weight on gestation length in Alentejano cows calving singles from AI (ALxAL) or ET (beef crosses).

#### REFERENCES

- (1) Burfening, P.J. et al. 1978. Phenotypic and genetic relationships between calving ease, gestation length, birth weight and preweaning growth. *J. Anim. Sci.*, 47: 595-600.
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