

# Comparison of Fixed Time Insemination of Heifers and Lactating Beef Cows using an Intravaginal Progesterone Releasing Device (CIDR-B), Estradiol Benzoate and Prostaglandin F<sub>2α</sub>, With Other Methods

T.A. Hamilton<sup>1</sup>, R.B. Stubbings<sup>2</sup> and G. Shewfelt<sup>3</sup>

<sup>1</sup>New Liskeard Agricultural Research Station  
Ontario Ministry of Agriculture, Food and Rural Affairs  
New Liskeard, Ontario

<sup>2</sup>Trillium Embryo Transfer, Guelph, Ontario

<sup>3</sup>Vetrepharm, London, Ontario, Canada

A series of 4 trials were conducted over 2 years, using suckled beef cows and virgin heifers, to compare the effectiveness of an estrus synchronization program with fixed time AI, utilizing a progesterone releasing intravaginal device (CIDR-B®, InterAg, New Zealand), with other controlled breeding strategies. The protocol consisted of:

- (i) intravaginal insertion of the CIDR-B on D 0, with estradiol benzoate administered either via an attached capsule (10 mg, CIDROL®, InterAg), (Expt. 1,2,3,4) or by IM injection (1 mg, Expt. 4)
- (ii) IM injection of PGF<sub>2α</sub> (5 ml Lutalyse®, Pharmacia & Upjohn) on D 6
- (iii) device removal on D 7, and
- (iv) IM injection with estradiol benzoate (1 mg) on D 8.

All animals in this protocol were inseminated 52 hrs after CIDR-B removal. Pregnancy determination was by transrectal palpation at approximately 42 days post synchronized breeding. The AI sires used were evenly distributed between treatments. Expt. 1 and 3 were conducted during spring breeding seasons (May), while Expt. 2 and 4 were in fall seasons (Sept). In Expt. 1, 26 cows and 7 heifers were assigned to the CIDR-B protocol, while 26 cows and 7 heifers were assigned to a GnRH/PG strategy. GnRH (2 ml Cystorelin®, P.V.U.) was injected IM on D 0, followed by PGF<sub>2α</sub> (5 ml Lutalyse) injection IM on D 6. Animals in the GnRH/PG treatment which were detected in heat by visual observation on D 8-10 were considered to be synchronized, and were inseminated once. Pregnancy rates for the CIDR-B protocol were 69% for cows and 78% for heifers, and for the GnRH/PG method were 69% for cows and 43% for heifers.

In Expt. 2, 28 cows and 11 heifers were assigned to the CIDR-B treatment, with 26 cows and 12 heifers assigned to the GnRH/PG treatment. Protocols were as in Expt. 1. Pregnancy rates for the CIDR-B method were

61% for cows and 73% for heifers, and for the GnRH/PG treatment were 50% for cows and 33% for heifers.

In Expt. 3, 27 cows and 8 heifers were allocated to the CIDR-B protocol, while 27 cows and 7 heifers were allocated to a GnRH/PG/LH method. This method was: (i) injection on D 0 with GnRH (2 ml Cystorelin), (ii) D 6 injection IM with PGF<sub>2α</sub> (2ml Estrumate®, Mallinkrodt Veterinary), at 1100h for cows and at 2100h for heifers, and (iii) injection IM on D 8 with LH (1.5 ml of Lutropin-V®, Vetrepahrm), with insemination on D 9 at 1100h. Pregnancy rates for the CIDR-B method were 78% for cows and 88% for heifers, and for the GnRH/PG/LH procedure were 52% for cows and 29% for heifers.

In Expt. 4 two CIDR-B protocols were compared: Treatment 1, estradiol on D 0 via CIDROL® capsule attached to the intravaginal device, and Treatment 2, estradiol on D 0 via IM injection (1 mg estradiol benzoate). Other procedures were as described initially. There were 28 cows and 12 heifers assigned to Treatment 1, with 26 cows and 12 heifers assigned to Treatment 2. Pregnancy rates for Treatment 1 were 64% for cows and 42% for heifers, and for Treatment 2 were 77% for cows and 58% for heifers. In summary, with suckled beef cows, the CIDR-B based protocol with single fixed time AI gave pregnancy rates equivalent to those with the GnRH/PG method with 3-4 days of heat detection. The CIDR-B protocol produced higher pregnancy rates with cows compared with the GnRH/PG/LH fixed time method. With virgin heifers, the fixed time CIDR-B based protocol produced superior pregnancy rates compared with either other method. Estradiol benzoate via injection on D 0 resulted in numerically greater pregnancy rates than E via capsule on D 0. For a given protocol, pregnancy rates tended to be lower in the fall season relative to the spring, which may reflect seasonal differences in the timing of physiological events.

**Table 1.** % Pregnant to Synchronized AI with Various Methods of Controlled Breeding

	CIDR-B /Ecap /PGF/E <sup>x</sup>	GnRH/PG <sup>y</sup>	GnRH/PG /LH <sup>x</sup>	CIDR-B /Einj /PGF/E <sup>x</sup>	P <sup>z</sup>
Expt 1 (spring)					
Cows	69 <sup>a</sup>	69 <sup>a</sup>			ns
Heifers	78 <sup>a</sup>	43 <sup>b</sup>			**
Expt 2 (fall)					
Cows	61 <sup>a</sup>	50 <sup>a</sup>			ns
Heifers	73 <sup>a</sup>	33 <sup>b</sup>			**
Expt 3 (spring)					
Cows	78 <sup>a</sup>		52 <sup>b</sup>		*
Heifers	88 <sup>a</sup>		29 <sup>b</sup>		**
Expt 4 (fall)					
Cows	64 <sup>a</sup>			77 <sup>a</sup>	ns
Heifers	42 <sup>a</sup>			58 <sup>a</sup>	ns

<sup>a,b</sup> values within a row, which do not share a common superscript are significantly different

<sup>\*</sup>, <sup>\*\*</sup> significant at the P<.10 and P<.05 probability levels, respectively

<sup>x</sup> single fixed time insemination

<sup>y</sup> inseminated once based on detected heat, during a 3-4 observation period

<sup>z</sup> probability that the treatment effect is due to chance

## Abstract

### Corticosteroids and glucose in bovine ketosis

N.H. Shpigel, R. Chen, Y. Avidar & E. Bogin

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The relative efficacy of dexamethasone and flumethasone alone or in combination with rapid intravenous infusion of glucose was compared in the treatment of ketosis in 127 dairy cows in Israel. All cows had a urinary acetoacetate concentration  $\geq 60$  mg/dl. Treatment comprised 500 ml of 50 percent glucose solution intravenously and 40 mg dexamethasone intramuscularly (Group 1), 40 mg dexamethasone intramuscularly (Group 2), 5 mg of flumethasone (Group 3), or 500 ml of 50 percent glucose solution intravenously and 5 mg flumethasone (Group 4). Treatment success was defined as recovery after a single injection without

relapse during the same lactation. Possible confounding factors affecting recovery (uterine disease, parity, pretreatment plasma glucose, serum  $\beta$ -hydroxybutyric acid and urine acetoacetate concentrations) were also evaluated. Treatment of Groups 1 and 4 was significantly more efficacious. Treatment of Group 2 cows was not significantly different from Group 3. Only uterine disease had a significant effect on recovery. This study showed that treatment of ketosis with both glucose and a corticosteroid was more efficient than with a corticosteroid alone.