Technical Bulletin

AgriHealth

Comparing reproduction programs in New Zealand dairy herds

Objectives

1. To demonstrate the efficacy of the DIB-V progesterone insert for treating New Zealand anoestrous dairy cows

2. To compare the relative efficacies of the progesterone insert programs with the GPG (ovsynch) program for the treatment of anoestrous dairy cows

3. To assess the relative efficacies of programs for the treatment of anoestrous dairy cows with and without the inclusion of equine chorionic gonadotropin (eCG)

Study Design

Over 2,000 non-cycling cows from 15 commercial dairy herds across New Zealand were enrolled in the Study. The Study was conducted in Spring 2010 and overseen by Veterinarians from seven rural practices.

To be eligible, cows had calved at least one month prior to planned start of mating (PSM) and not shown signs of oestrus during premating heat detection (beginning 35 days prior to PSM).

Ten days prior to PSM the enrolled cows were randomly assigned to one of four treatment groups

1. DIB-Synch (DIB-V + GPG)

2. CIDR-Synch (CIDR + GPG)

3. GPG (ovsynch)

4. DIB-Synch Plus
   (DIB-Synch + 400IU eCG at device removal)

Cows in all treatment groups were inseminated to set time artificial insemination (AI) approximately 16 – 20 hours after the final GnRH injection. If cows were observed in heat after device removal and within 48 hours of the set time AI, they were inseminated to this detected heat.

Cows were pregnancy tested and foetally aged to determine pregnancy rates over time for the initial six weeks.

Results

Cows in groups 1 and 2 had equivalent pregnancy rates, demonstrating that the DIB-V progesterone insert is efficacious in treating non-cycling cows under New Zealand field conditions. Cows in group 3 (GPG) tended to have lower pregnancy rates to set time AI than all other groups.

Addition of eCG to the DIB-Synch program (group 4) resulted in superior pregnancy outcomes. Cows that received 400 IU eCG at the time of DIB-V removal trended to higher pregnancy rates to set time AI when compared to Group 1 and 2, and a significantly better pregnancy rate than the ovsynch group. The eCG group had significantly higher 4 week in-calf rates when compared to treatment groups 1, 2 and 3 (63.1% vs. 55.9%, 56.6%, 55.2% respectively; p<0.05).
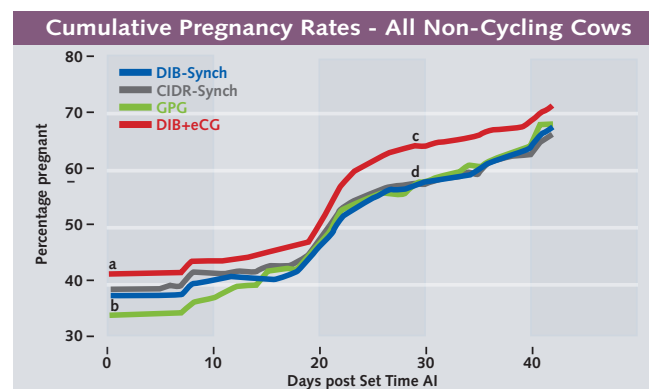
Graph 1. Cumulative pregnancy curve by treatment group - all non-cycling cows. Data points with different labels are significantly different; (a,b p=0.02; c,d p<0.05)

Data was analysed to assess the interaction between number of weeks calved prior to PSM and treatment effect. Overall, combining all treatment groups as the number of weeks between calving and PSM increased, the pregnancy rate at set time AI and 4 week in-calf rate increased.

Cows that received eCG at the same time as the progesterone insert was removed (group 4) had better pregnancy outcomes compared to a progesterone program without eCG (DIB-Synch + CIDR-Synch combined; = P4 program). Pregnancy rates at set time AI were higher in eCG treated cows compared to P4 programs. The improvement was a strong trend (p=0.09) for cows calved longer than 6 weeks, and was statistically significant for cows that had calved at least 7 weeks prior to PSM (p≤0.03).
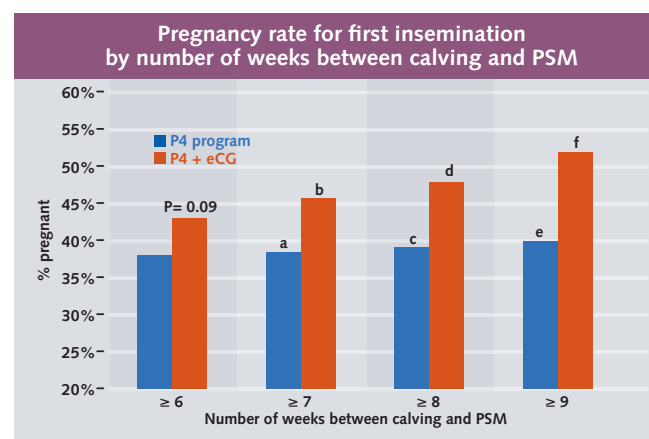
Graph 2. Pregnancy rate for set time AI by number of weeks between calving and PSM. Data points with different labels are significantly different; (a,b p=0.03; c,d p=0.01; e,f p=0.002)

Four week in-calf rates were also significantly higher in eCG treated cows than P4 programs when the cows had been calved at least 6 weeks prior to PSM (p≤0.02).
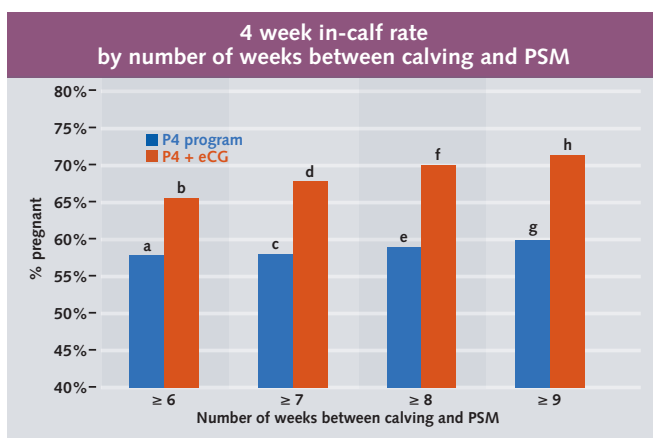
Graph 3. 4 week in-calf rate by number of weeks between calving and PSM. Data points with different labels are significantly different; (a,b p=0.02; c,d p=0.003; e,f p=0.001; g,h p=0.003)

Discussion

eCG has a long half-life (3 – 5 days), with both FSH and LH effects when administered to cattle. These characteristics of eCG combine to support the developing follicle, once the follicle is no longer under the influence of progesterone during the proestrus period. Stimulating both the FSH and LH receptors of the forming follicle in anoestrous cows results in improved follicular development. The outcome is improved follicle viability, often culminating in ovulation of a larger ovum.

In addition, eCG causes an increase in the function of the corpus luteum (CL) formed after ovulation. This improved luteal function results in increased progesterone production. This higher progesterone level is responsible for maintaining the early pregnancy.

Thirdly, a more effective endocrine feedback mechanism is understood to be partially responsible for the significant lift in 28 day pregnancy rates. It is believed that the stronger luteal function produced by the eCG effect means cows are more likely to 'return' and ovulate at 18 – 24 days, if conception does not occur at the initial ovulation, resulting in fewer 'phantom' pregnancies.

A tight pattern of return to oestrus was demonstrated in eCG treated cows in the current study. The number of cows that returned to oestrus within 18 days of set time AI ('short returns') was significantly higher in the GPG cows (group 3) when compared to the treatments including progesterone (groups 1, 2 and 4). The increased incidence of short returns in group 3 is likely due to either a failure of synchrony following the GPG treatment, and/or increased luteal insufficiency following set time AI.

Conclusions

This study demonstrated that the DIB-V progesterone-releasing insert is efficacious for treating New Zealand anoestrous dairy cows. The pregnancy results for cows treated with the 1g DIB-V insert were the same as those treated with the 1.38g CIDR insert.

Cows treated with a GPG program (without a progesterone insert) tended to have lower pregnancy rates to set time AI than those treated with a DIB-Synch or CIDR-Synch program. This group also experienced a higher number of cows with short returns to oestrus. This supports previously published data.

Adding eCG to a GPG + progesterone treatment program was shown to improve pregnancy rates when compared to either GPG or GPG + progesterone treatments. Overall eCG treated cows that had calved at least 6 weeks prior to the PSM (i.e. 33 days prior to progesterone device insertion) had better pregnancy rates to both set time AI and 4 week in-calf rate, compared to very short calved cows.

Products used in this Study

DIB-V (A10319)
Gonasyn (gonadorelin) (A10642, RVM)
Cyclase (cloprostenol) (A10490, RVM)
Novormon eCG (A10641, RVM)
CIDR (A04559) - Registered to Zoetis NZ Ltd

DIB is a trademark of Syntex S.A and distributed in New Zealand by AgriHealth NZ Ltd

Animal Ethics Approval RAEC No: 12132

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