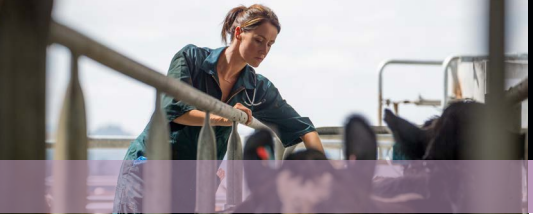




# PROGESTERONE INSERTS FOR NZ ANOESTROUS DAIRY COWS

In NZ seasonal calving systems with a mating period of 10-14 weeks, approximately 20% of cows in each herd are anoestrous (no visible oestrus, NVO) at the herd's planned start of mating (PSM) (Rhodes et al, 2003). For the best economic return, anoestrus treatment is administered so that the set-time artificial insemination (STAI) coincides with the PSM (Hanlon, 2010).

Anoestrus treatment programs most commonly include a progesterone insert. It is generally accepted that plasma progesterone concentrations >1ng/mL are required to ensure cows do not exhibit oestrus and/or ovulate whilst under treatment with a progesterone insert (Rathbone, 2001).

Several commercial inserts are available in NZ, each containing a different quantity of progesterone. These have been shown in plasma progesterone bioequivalence studies to have similar peak concentrations of progesterone and mean progesterone concentration from insertion to Day 7 (Rogan et al, 2007).

**PLASMA PROGESTERONE LEVELS IN LACTATING COWS**

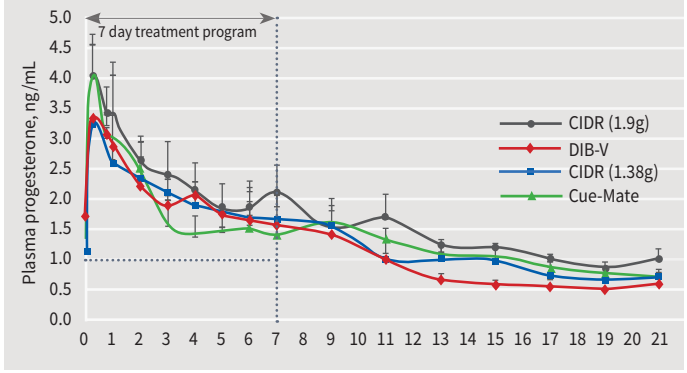



*Figure 1. Plasma progesterone levels in lactating Holstein cows treated with various progesterone inserts over 21 days.*

Therefore there was a belief that these progesterone inserts would have similar pregnancy outcomes in 7 day programs when compared in reproductive efficacy studies.

A series of studies has been undertaken by AgriHealth to compare treatments of NZ anoestrous dairy cows. In the studies, anoestrous cows that were more than 25 days calved, were presented by farmers for enrolment, following >21 days of heat detection. Cows were presented for treatment 9-10 days prior to the PSM.

Cows in all treatment groups were inseminated to STAI approximately 16-20 hours after the final GnRH injection. If cows were observed in heat after device removal they were inseminated to this detected heat. Dated pregnancy testing was undertaken in all herds by the overseeing veterinarians to determine day of conception. Pregnancy rates at STAI and 28 days were compared between the treatment groups.

## STUDY 1: Objective

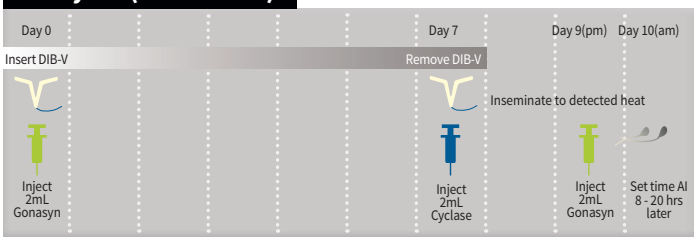
To compare the efficacy of intravaginal progesterone inserts containing either 1.38g (CIDR), or 1.0g (DIB-V) progesterone for the treatment of NVO dairy cows in New Zealand.

## Study design

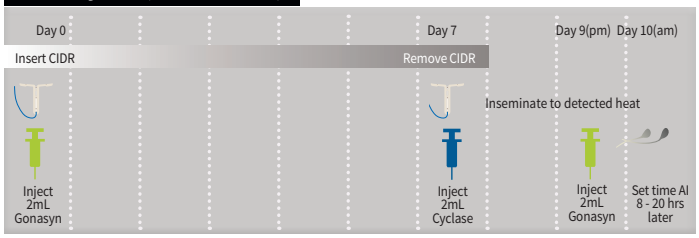
954 non-cycling cows from 12 commercial dairy herds across NZ were enrolled in the Study. The Study was conducted in Spring 2010 and overseen by 8 Veterinarians from 7 rural Veterinary Practices. Enrolled cows were assigned to one of two treatment groups:

## Results

**DIB-Synch (DIB-V + GPG)**




**CIDR-Synch (CIDR + GPG)**




| Treatment (progesterone content) | Proportion conceiving (95% CI) | |
|---|---|---|
| | STAI | 28 day |
| DIB-V (1.0 g) | 0.38 (0.33 – 0.42) | 0.56 (0.52 – 0.60) |
| CIDR (1.38 g) | 0.38 (0.34 – 0.43) | 0.57 (0.52 – 0.61) |

*Table 1. Pregnancy results*

The results from Study 1 are shown in Table 1. There was no difference between DIB-V and CIDR treatment groups for any of the outcomes measured (p> 0.05), which included proportion conceiving to STAI, proportion conceiving within 28 days from PSM, and interval from end of treatment to conception.

**CUMULATIVE PREGNANCY RATE BY TREATMENT GROUP**

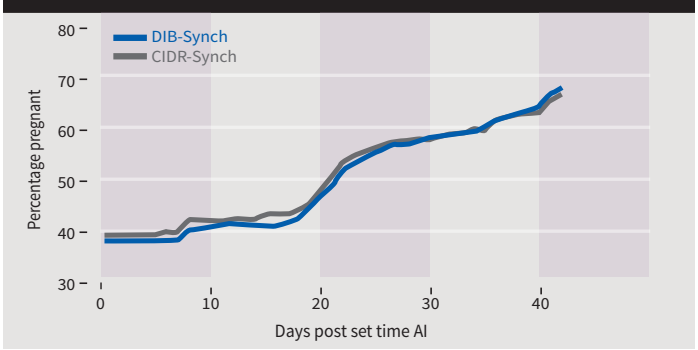



*Figure 2: Cumulative pregnancy for DIB-V and CIDR treatment groups.*

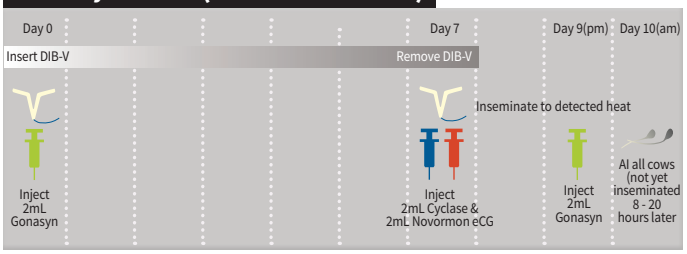
## STUDY 2: Objective

To compare the efficacy of intravaginal progesterone inserts containing either 1.0g (DIB-V), or 0.5g (DIB-h) progesterone for the treatment of NVO dairy cows in New Zealand.

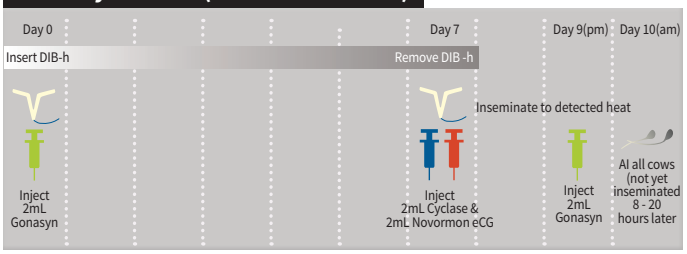
## Study design

1002 non-cycling cows from 16 commercial dairy herds across NZ were enrolled in the Study. The Study was conducted in Spring 2012 and overseen by 10 Veterinarians from 9 rural Veterinary Practices. Enrolled cows were assigned to one of two treatment groups:

**DIB-V Synch Plus (DIB-V + GPG + eCG)**




**DIB-h Synch Plus (DIB-h + GPG + eCG)**




## Results

| Treatment (progesterone content) | Proportion conceiving (95% CI) | |
|---|---|---|
| | STAI | 28 day |
| DIB-V (1.0 g) | 0.45 (0.41 – 0.50) | 0.65 (0.60 – 0.69) |
| DIB-h (0.5 g) | 0.43 (0.38 – 0.47) | 0.65 (0.61 – 0.69) |

*Table 2. Pregnancy results*

The results from Study 2 are shown in Table 2. There was no difference between DIB-V and DIB-h treatment groups for any of the outcomes measured (p> 0.05), which included proportion conceiving to STAI, proportion conceiving within 28 days from PSM, and mean interval from end of treatment to conception.

**CUMULATIVE PREGNANCY RATE BY TREATMENT GROUP**

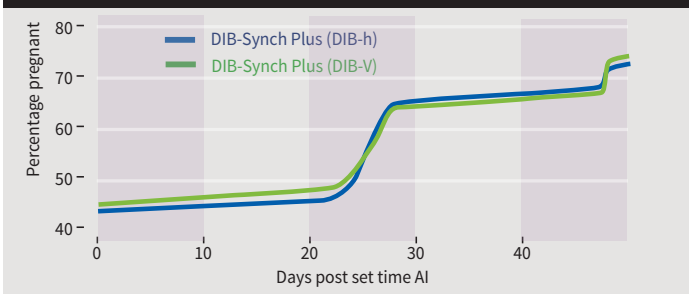



*Figure 3: Cumulative pregnancy for DIB-V and DIB-h treatment groups*

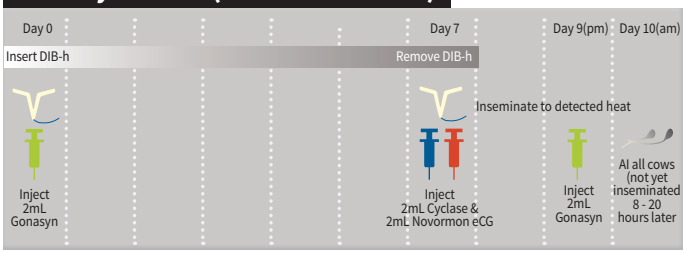
## STUDY 3: Objective

To compare the efficacy of intravaginal progesterone inserts containing either 0.5g (DIB-h), or 1.38g (CIDR) progesterone for the treatment of NVO dairy cows in New Zealand.

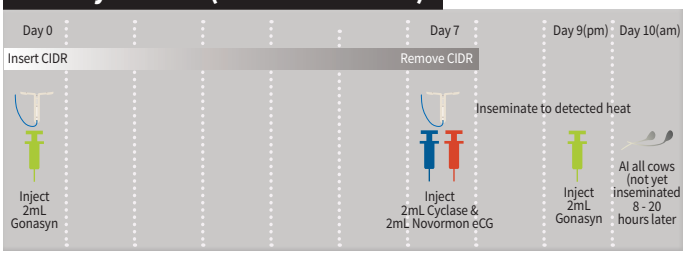
## Study design

1060 non-cycling cows from 10 commercial dairy herds in the Waikato region were enrolled. The Study was conducted in Spring 2013 and overseen by Veterinarians from 5 rural Veterinary Practices. Enrolled cows were assigned to one of two treatment groups:

**DIB-h Synch Plus (DIB-h + GPG + eCG)**




**CIDR Synch Plus (CIDR + GPG + eCG)**




## Results

| Treatment (progesterone content) | Proportion conceiving (95% CI) | |
|---|---|---|
| | STAI | 28 day |
| DIB-h (0.5 g) | 0.42 (0.38 – 0.46) | 0.60 (0.56 – 0.65) |
| CIDR (1.38 g) | 0.43 (0.39 – 0.47) | 0.60 (0.56 – 0.65) |

*Table 3. Pregnancy results*

The results from Study 3 are shown in Table 3. There was no difference between DIB-h and CIDR treatment groups for any of the outcomes measured (p> 0.05), which included proportion conceiving to STAI, proportion conceiving within 28 days from PSM, and interval from end of treatment to conception.

**CUMULATIVE PREGNANCY RATE BY TREATMENT GROUP**

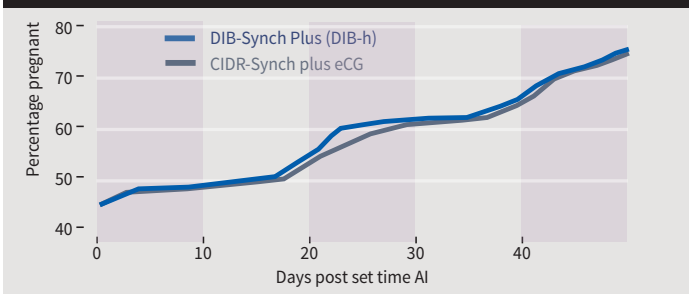



*Figure 4: Cumulative pregnancy for CIDR and DIB-h treatment groups*

## Discussion

The three studies compared reproductive outcomes for anoestrous dairy cows treated with progesterone inserts containing 0.5g, 1.0g and 1.38g of progesterone. There were no differences seen in pregnancy rates at STAI, 28 days after treatment, or any later time point, for any of the studies.

Release of progesterone from an intravaginal device over a 7 day treatment period is not directly correlated with the quantity of progesterone initially contained in the insert, but is more related to the surface area of the insert and the thickness of the silicon skin (Macmillan, 2014). If inserts contain a higher level of progesterone at the outset of treatment, modern anoestrous cow treatment programs typically lead to more residual progesterone in the insert at the conclusion of the 7 day treatment period.

The results from these studies support international literature which demonstrate bioequivalence of plasma progesterone levels in cows treated with intravaginal inserts containing various levels of progesterone (Rogan et al 2007, Videla et al 2008).

## Conclusions

This series of studies demonstrates that anoestrous dairy cows in NZ treated with programs which include DIB-V, CIDR, or DIB-h progesterone inserts for the seven day treatment period have equivalent pregnancy outcomes.

## Products used in the studies

DIB-V (A10319)

DIB-h (A10832)

Gonasyn (gonadorelin) (A10642, RVM)

Cyclase (cloprostenol) (A10490, RVM)

Novormon eCG (A10641, RVM)

CIDR (A04559) – Registered to Zoetis NZ Ltd

DIB progesterone inserts, Gonasyn, Novormon and Cyclase are manufactured by Syntex S.A. These products are marketed in New Zealand by registrant AgriHealth NZ Ltd.

All studies were conducted under the approval of the Ruakura Animal Ethics Committee.

AgriHealth would like to acknowledge and thank the veterinarians, veterinary practices and farmers involved in these three NZ trials.

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