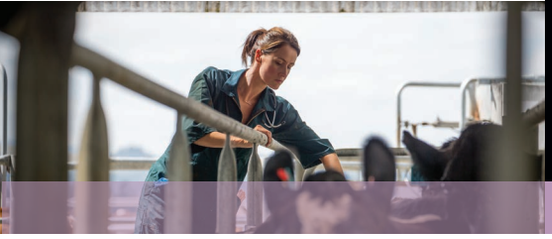

PREGNANCY RATES FOLLOWING SYNCHRONY PROGRAMS IN BEEF COWS

Objective

To evaluate in-calf rates of adult post-partum beef cows synchronised and mated with fixed time artificial insemination (FTAI), using the 7&7 synchrony program (7&7 Synch) compared to the widely used 7-day Co-Synch program (7dCS).

Background

Synchrony of cows and heifers is not widely used in the NZ beef industry. There are approximately 1 million beef breeding cows and heifers in NZ of which only around 20,000 undergo synchrony and artificial insemination each year (2%). Progeny testing undertaken by Beef and Lamb NZ (B+LNZ)[1] shows conclusively that using higher genetic merit dams and sires (by synchronising dams and inseminating with high genetic merit semen) results in better offspring with improved productivity, and therefore better profitability for beef farmers.

A recent large American study[2] investigated conception rates in post-partum beef cows that were synchronised and mated with FTAI (both conventional and sex-sorted semen), using 7&7 Synch compared to 7-day Co-Synch. Pregnancy percentages resulting from FTAI were significantly greater among cows treated with 7&7 Synch compared with 7-day Co-Synch (conventional semen: 72% vs 61%; sex-sorted semen: 52% vs 44%; p=0.001).

The purpose of this NZ study was to determine if the results from the American study could be repeated in post-partum beef cows extensively grazed under NZ management conditions.

Materials and methods

The study was undertaken on 5 New Zealand commercial beef farms across 3 years, and enrolled 1,166 post-partum, suckled beef cows prior to the planned start of mating on each farm.

Cows were enrolled into the study on one calendar day for each farm, and were randomly assigned to two treatment groups. Half of each herd began the 7&7 program (treatment group, 7&7), while the remaining cows began the 7-day Co-Synch (control group, 7dCS) a week later. 7&7 cows received a DIB-V progesterone insert and an IM injection of 3mL Cyclase (750µg cloprostenol) on Day -17. On Day -10, the 7dCS cows received a DIB-V insert, and both treatment groups received an IM injection of 2mL Gonasyn (100µg gonadorelin, GnRH). The synchrony program was the same for the two treatment groups from this time: on Day -3 the DIB-V was removed and cows received IM injections of 3mL Cyclase and 2mL Novormon (400IU eCG); on day 0 the cows received 2mL Gonasyn and were mated to FTAI, between 56-66 hours after the removal of the DIB-V insert.

Treatment groups were run together in one herd for the duration of the study.

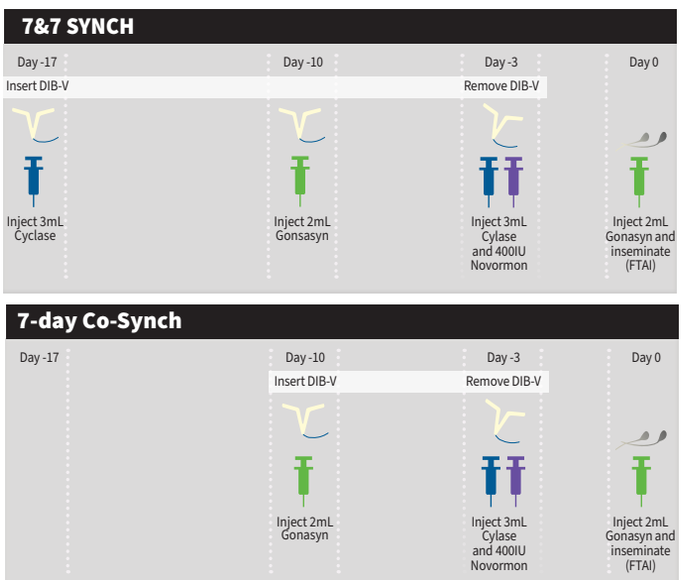

Figure 1: Synchrony program for 7&7 Synch and 7-day Co-Synch

Cows were pregnancy tested using rectal ultrasound by a skilled operator, and for positive pregnancies the timing of conception was assessed and correlated to FTAI (or not).

Data was collated and analysed to assess the effect of synchrony program on the success of pregnancy to FTAI, using logistic regression.

Results

1,166 cows were enrolled to the study (578 cows 7&7 and 588 cows 7dCS). Eight cows were excluded from the final dataset due to missing pregnancy diagnosis (2 cows 7&7, 6 cows 7dCS) leaving 1,158 cows available for analysis. Summary information is presented in Table 1.

	Overall n = 1,166(%)	7dCS n = 588(%)	7&7 n = 578(%)	*p-value*[*]
Farm				*0.9*
Farm 1	139 (12%)	67 (11%)	72 (12%)	
Farm 2	124 (11%)	62 (11%)	62 (11%)	
Farm 3	335 (29%)	171 (29%)	164 (28%)	
Farm 4	55 (4.7%)	31 (5.3%)	24 (4.2%)	
Farm 5	513 (44%)	257 (44%)	256 (44%)	
Year				*>0.9*
2021	513 (44%)	257 (44%)	256 (44%)	
2022	318 (27%)	160 (27%)	158 (27%)	
2023	335 (29%)	171 (29%)	164 (28%)	

[*]Pearson's Chi-squared test

Table 1: Number of animals enrolled into treatment groups by farm and year

After accounting for farm, there was a significant difference in the risk of conception to FTAI between animals in the 7&7 group compared to the 7dCS group (p = 0.021; Table 2). Calendar year was completely accounted for by including farm in the model.

	Odds ratio	95% Confidence Interval	*p-value*
Group			*0.021*
7dCS	—	—	
7&7	1.32	1.04, 1.67	
Farm			*0.01*

Table 2: Logistic regression output comparing conception to FTAI between 7dCS and 7&7 treatment groups

The probability of conception for animals in the 7&7 group was 0.61 (95% CI 0.56 - 0.66), compared to 0.54 for the 7dCS group (95% CI 0.49 - 0.59), an improvement of 6.1% (Figure 2). Whilst there was a significant difference in the conception rate between farms (p = 0.01), this did not modify the association between treatment and conception to fixed time AI (interaction term p = 0.98). It can be concluded that the effect was consistently positive across farms, despite varying baseline conception rates between farms.

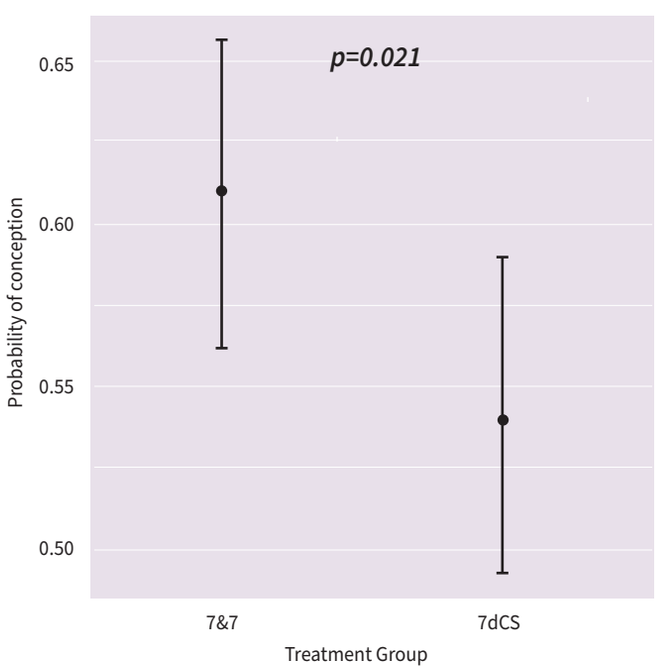

Figure 2: Predicted conception rate probability, and 95% confidence interval for cows in either 7&7 or 7dCS synchrony groups. Model outputs are from a logistic regression model including farm and treatment group

Discussion

This study showed a 6% improvement in the probability of conception to fixed time AI for beef cows synchronised with a 7&7 synchrony program, compared to the widely used standard program (7-day Co-Synch). There was a difference between farms in conception rate, however the improvement of the 7&7 program was consistently more effective on all of the farms.

This result is consistent with the improvement shown in pregnancy rates in a large study in North American beef cows, where the 7&7 program improved conception rate by 11%[2].

Compared to the synchrony program currently used in NZ beef cows (7-day Co-Synch), the 7&7 program requires one additional dose of prostaglandin (PG), and one additional yarding of the cows. Beef farmers are likely to accept these additional costs of this program, as the size of the improvement in pregnancy rate (resulting in additional valuable calves born) far outweighs the cost of these additional program components.

Conclusion

Treatment of post-partum beef cows with the 7&7 synchrony program including Novormon significantly improved pregnancy rates compared to the widely used 7-day Co-Synch program. This improvement was consistently effective in cows from all farms enrolled.

References

[1] Beef+Lamb New Zealand Genetics; https://www.blnzgenetics.com/progeny-tests/beef-progeny-tests

[2] Andersen, C et al. Evaluations of the 7&7 Synch and 7-day CO-Synch + CIDR treatment regimens for control of the estrous cycle among beef cows prior to fixed-time artificial insemination with conventional or sex-sorted semen. Animal Reproduction Science 235, 106892, 2021.

This study was conducted under approval numbers 15501 and 0442 of the AgResearch Animal Ethics Committee.

DIB-V is a Registered Veterinary Medicine ACVM No A10319. Gonasyn, Cyclase and Novormon are Restricted Veterinary Medicines Nos A10642, A10490 and A10641. Available only under Veterinary Authorisation.