Using CIDRs™ to control reproduction of ewes in the non-breeding season: update

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In Quebec, despite the popularity of light control for inducing estrus in the non-breeding season, hormonal techniques are still widely used. Officially approved for use in Canada since 2010, CIDR devices have now replaced the vaginal sponge. However, as on-farm data follow-up is often lacking, it was difficult to obtain precise figures and have a clear idea of the actual success rate of the technique. It was in this context that we undertook this project. Since the non-breeding season is now upon us, we thought it was timely to review the subject and present partial results from Phases 1 and 2 of this project.

Main Objective

This project aims to evaluate the standard procedure for using CIDRs and to develop a new procedure that would bring about a 10% increase in ewe fertility in the non-breeding season, thus improving both the productivity and profitability of sheep production.

Standard Procedure

- 6 trials in 2012: in May (2), in June (2) and in July (2) at two producers' farms plus one trial (in May) at the CEPOQ experimental station
- 220 F1 prolific Dorset x Romanov ewes (25 to 38 ewes in each trial)
- Mature ewes that have had at least one lambing
- Interval from lambing to introduction of rams: > 80 days
- Introduction to rams: 24 hours after removal of CIDR device
- Duration of the breeding period: 35 to 42 days
- Two treatments compared:
  - Control: CIDR for 14 days; 500 IU PMSG at removal
  - Short Term: CIDR for <14 days + 500 IU PMSG and 20 mg prostaglandin F2α at removal
- Assignment in the treatments is according to:
  - Ewe weight: 63.0 ± 11.6 kg
  - Body condition score: 3.0 ± 0.5
  - Estrus cyclicity (blood progesterone assay)

Phase 1 (Summer, 2011)

The first stage of the project was to collect technical data from sheep producers in Quebec's Eastern Townships region on the use and effectiveness of CIDRs in the non-breeding season. This was done to determine whether the results reported were obtained under the best possible management of the CIDR-treated ewes.

What we found out:

- CIDRs are being used according to the generally recognized standard procedure: 14 days of treatment, PMSG injected at device removal.
- Fallout rate of the CIDRs is generally <5%, but there are significant discrepancies (0% to 27.5%).
- Fertility rate is around 75%: but varies a great deal (from 50% to more than 95%).

Phase 2 (Spring and Summer, 2012)

As part of Phase 2, we tested the effectiveness of three procedures for using the CIDR device. To do this, we carried out seven experimental trials in the non-breeding season, including one trial at the *Centre d'expertise en production ovine du Québec* (CEPOQ) experimental station and

six trials on two sheep farms in the Eastern Townships. In all, 331 prolific F1 (Dorset x Romanov) ewes were treated with CIDR devices. However, we are presenting only the results of the control and short-term treatments here, so the article will be easier to follow. This brings the number of ewes down to 220. Our specific aim in this article is to demonstrate the extent to which, and under what conditions, CIDR treatment is an effective means of inducing estrus in the non-breeding season. *We have been deliberately vague about the precise details of the short-term CIDR treatment procedure to avoid having producers start using it before our final validation trials are completed in the fall of 2013.*

CIDR fallout: not really a problem in our trials

A total of 331 CIDRs were inserted as part of Phase 2, using the *Zoetis* commercial applicator. Once the CIDR device was in place in the vagina, the nylon cord was systematically cut at about 1 cm from the vulva. In total, only two of the 331 CIDRs were lost, which corresponds to a fallout rate of less than 1%.

Table 1. Proportion (%) of Dorset x Romanov ewes displaying an induced estrus in the hours following CIDR removal.

	CEPOQ Station		Producer 1		Producer 2	
	Control	Short-term	Control	Short-term	Control	Short-term
Estrus (%)						
< 24 hrs.	33.3	6.7	19.5	14.5	12.5	12.5
< 48 hrs.	93.3	80.0	96.1	96.3	72.5$_a$	100$_b$
< 72 hrs.	100	93.3	100	98.1	92.5	100

^{a,b} Statistically significant difference (P< 0.05)

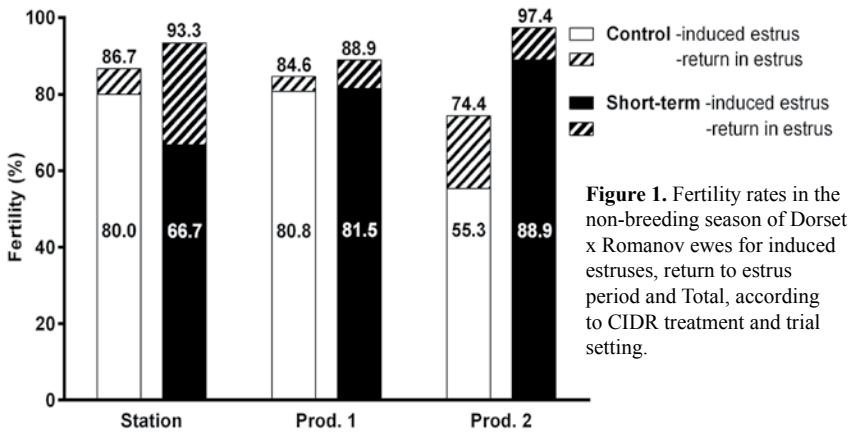

Figure 1. Fertility rates in the non-breeding season of Dorset x Romanov ewes for induced estruses, return to estrus period and Total, according to CIDR treatment and trial setting.

Induced estrus

The rates of induced estrus in the 72 hours following removal of the CIDR device (time 0) were greater than 90% and this was similar for both treatments (Table 1). Differences in induced estrus were only observed between the treatments at the farm of Producer 2, where the short-term treatment induced estrus faster than the control treatment in the period 0 to 48 hours after removal of the CIDR device (100% vs. 72.5%; Table 1).

Fertility and prolificacy

We analysed fertility at lambing from two points of view: fertility due to CIDR-induced estrus, i.e., successful mating taking place within four days of device removal, and total fertility, successful mating anytime during the entire mating period. This differentiation is important to enable a proper assessment of an estrus-inducing treatment. What we are looking for, ideally, is a treatment that is highly effective at inducing estrus and that provides the greatest induced-estrus fertility rates. The effectiveness of the treatment will have even more influence on the fertility of the flock if the breeds or crossbreds used have a naturally short breeding season, as is usual in terminal sire breeds. In such cases, ewes that do not become pregnant at the estrus induced by the CIDR treatment will not cycle again. Hence, total fertility will be equal to the fertility of the induced estrus. For this reason it is important to implement a synchronization treatment that is as effective as possible.

On average, the control treatment yielded a fertility of 55.3-80.8% for induced estruses and a total fertility of 74.4-86.7%, depending on the trial setting (Figure 1).

The effect of the two treatments on the fertility of the induced estruses was different depending on the trial site. At the experimental station and on the farm of Producer 1, both treatments resulted in a comparable fertility rate of around 80% for the induced estruses (Figure 1). At the farm of Producer 2 however, the short-term procedure resulted in a significantly higher fertility rate than that obtained with the control treatment (88.9% vs. 55.3%).

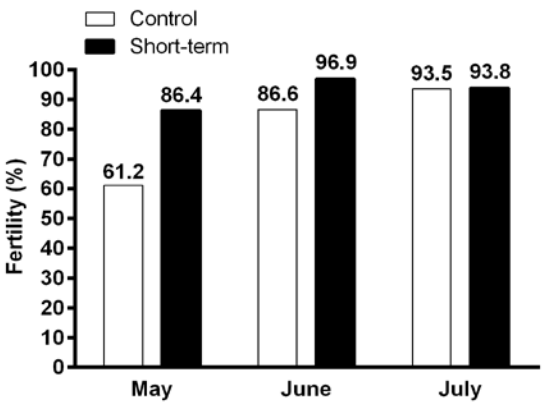

Figure 2. Fertility of Dorset x Romanov ewes at the two producers' farms combined, according to CIDR treatment and month of matings in the non-breeding season.

As for the total fertility, the short-term treatment enabled us to obtain a rate significantly higher than that obtained with the control treatment (92.5% vs. 81.1%).

In most cases, we observed a difference of less than

10% between induced and total fertility. However, on the farm of Producer 2, up to 26.8% additional fertility was obtained through matings in the return to estrus period. These results demonstrate that using a ewe with a longer natural breeding season (Dorset x Romanov) can help improve the total fertility rate of ewes not impregnated during the CIDR-induced estrus period. Had a breed with a naturally short breeding season been used, the fertility results at this producer's farm could have been very disappointing, especially with the control treatment. The short-term treatment appears to have performed better in the different settings. It will be interesting to test

the performance of this procedure in other conditions, in particular with more seasonal breeds (to be done during the summer of 2013).

Total fertility was different depending on the month of matings. Results obtained in May were not as good as those in June and July at the producers' farms where the three trials were repeated (Figure 2). This observation is consistent with what is recognized by the producers of F1 prolific ewes, namely that fertility rates are generally lower in May. The intensity of seasonal anestrus at this time of year is probably the main cause. We will be able to test this hypothesis in the coming months as we analyse the blood profiles done during this project.

Prolificacy for the treatment-induced estrus of the ewes ranged from 1.60 to 2.67 lambs born per ewe lambing, all trials combined, with an average of 2.20.

The remainder of the project

Phase 3 will take place over the spring and summer of 2013 and will compare the control and short-term treatments evaluated in Phase 2. We will attempt to verify the repeatability of these two protocols on several farms, under different management conditions and with a large number of ewes of different genotypes. In this way, we should be able to formulate reliable recommendations as to which procedure to adopt for using CIDRs in the non-breeding season.

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