

Update on pregnancy and lambing rates in seasonally anestrous ewes bred to a new synchronization protocol and laparoscopic timed artificial insemination (TAI).

This research project was first described in the March 2014 (Vol. 33, Issue 1) issue of Ontario Sheep News. Some of the details below are found in that article. However, further results of this project are reported here.

Ewes out of their natural breeding season have poor reproductive performance even after the application of conventional controlled breeding techniques. Maximizing reproductive performance is important for producer profit and to remove seasonality of lamb production. Ovarian follicle (the egg-bearing structure; some follicles produce estrogen) development and ovulation are more predictable in seasonally anestrous ewes treated with sponge-estrogen-Folligon[®] vs. sponge-Folligon[®]. Sponges were discontinued and replaced by controlled internal drug releasing devices (CIDRs; Eazi-Breed CIDR[®] for Sheep and Goats).

Recently, the Barrett lab compared the hormonal and ovarian response in out of season ewes treated with either sponge-estrogen-Folligon[®] or CIDR-estrogen-Folligon[®] and observed no differences in the hormonal or ovarian response. The next step was to determine the reproductive performance of ewes out of the breeding season that are treated with a CIDR-estrogen-Folligon[®] protocol within commercial farm settings. In 2012, the animal handling phase of a project was completed comparing the effects of a CIDR-estrogen-Folligon[®] treatment or CIDR-Folligon[®] treatment on the ovarian/hormonal response, heat, pregnancy, and lambing rates in seasonally anestrous ewes naturally bred. This 2012 project is not the focus of this article, but it will be briefly touched on later in the article.

The objectives of the latest project (2013-15) were to compare the effects of a CIDR-estrogen-Folligon[®] treatment or CIDR-Folligon[®] treatment on the ovarian/hormonal response, heat, pregnancy, and lambing rates in seasonally anestrous ewes bred by laparoscopic TAI.

A total of 111 seasonally anestrous ewes from three (A, B, and C) commercially operating farms received CIDRs for 12 days followed by an intramuscular injection of Folligon[®] at CIDR removal. Half the ewes on each farm were randomly assigned to receive an intramuscular estrogen injection 6 days before CIDR removal. Ewes were teased with rams starting one day after CIDR removal and 98 ewes were subjected to laparoscopic TAI two days after CIDR removal. Blood samples and ultrasound images were collected, and heat, pregnancy, and lambing data were recorded.

The animal handling phases of this project were completed in June 2013 and July 2015. The blood concentration of estrogen was similar between treatments on the day of estrogen treatment and CIDR removal. The blood estrogen concentrations were significantly higher on Farm C than Farm B on the day of estrogen treatment and CIDR removal. Maximum follicle diameter was significantly larger on the day of CIDR removal than the day of estrogen treatment (by 1.5 mm). Behavioural heat was similar between treatments.

Pregnancy rates were 40.8% vs. 40.8% for estrogen and non-estrogen treated ewes. There was significant variability in pregnancy rates among farms: 54.5% vs. 36.4% (Farm A); 24.0% vs. 20.8% (Farm B); 57.1% vs. 78.6% (Farm C) for estrogen and non-estrogen treated ewes. Lambing rates were 34.7% and 34.7% for estrogen and non-estrogen treated ewes. Variability in lambing rates among farms was also observed: 45.5% vs. 36.4% (Farm A); 16.0% vs. 16.7% (Farm B); 57.1% vs. 64.3% (Farm C) for estrogen and non-estrogen treated ewes. Day of lambing relative to CIDR removal was significantly earlier on Farm B (137 days) and ewes

treated with estrogen lambed significantly earlier (by 3 days). The farm with the highest blood estrogen concentrations on the day of estrogen treatment and CIDR removal had the highest pregnancy and lambing rates which may indicate improved follicle development for this flock.

Overall, there appear to be no differences in ovarian response, blood estrogen, heat, or pregnancy or lambing rates in anestrus ewes treated with estrogen or no estrogen in a CIDR-Folligon[®] heat synchronization protocol. However, ewes treated with estrogen lambed significantly earlier. Variability in blood estrogen, and pregnancy and lambing rates was large among farms, which could be associated with factors such as management practices, ram semen used for breeding, and breed and age of the animals.

Combining the results of this project, involving 98 ewes on 3 farms, with the previous natural breeding project, involving 204 ewes on 3 farms, indicates that, in 79% of the ewes studied, a numerically higher pregnancy rate was observed in those ewes treated with estrogen.

This project is a collaboration of Dalhousie University (David Barrett, Miriam Gordon, Samantha Turner, Alyssa Nickerson, Buddika Malaweera, Lindsay Carroll, Meleigha Payne, William Hannah, Sarah Gatti-Yorke, Margie Hartling), AAFC (Julie Small and Traci Gowan), the University of Guelph (Pawel Bartlewski), three NS sheep producers, and OC Flock Management.

This project was funded by the Ontario Sheep Marketing Agency; part of the MSc student's stipend was funded by the AAFC/Nova Scotia Department of Agriculture Growing Forward 2 Technology Development Program. Zoetis and Intervet donated some of the pharmaceuticals. Thank you to all of our funding partners.