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The Effect of Melatonin Dosage on Reproductive Performance in Anestrous Ewes

A. M. Wolf
South Dakota State University

A. L. Slyter

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Summary

An implant form of melatonin, Regulin¹, was tested during the 1985-86 breeding season to determine dosage effects. Three or five implants were used throughout an 83-day breeding season. The mean lambing date was not different (P>.05) for the three-implant treatment compared to the five. All other parameters tested showed similar results. Therefore, no advantage in reproductive performance was observed for five vs three implants.

(Key Words: Sheep, Anestrous Ewe, Melatonin, Breeding Season.)

Introduction

The yearly anestrous period in sheep is a point at which productivity in the ewe may be increased. A producer may take advantage of higher out-of-season lamb markets and more efficient use of buildings, labor and resources if a successful method to stimulate earlier cyclic activity could be achieved.

Melatonin, a hormone secreted by the pineal gland in response to shortening daylength, has the potential to induce estrus earlier in the breeding season. Under normal conditions (as daylength decreases during the fall), the pineal gland will increase the production of melatonin. As melatonin levels increase, the ewe will gradually move from deep anestrous to a fertile breeding period. This trial was conducted to evaluate the effect of three vs five implants in their ability to induce an earlier breeding period.

Experimental Procedure

Forty-two Targhee ewes 7 to 9 years of age were shorn, weighed, wormed, hooves trimmed and number paint branded prior to being randomly allotted to one of the following two treatments: (1) three Regulin implants (3 imp) and (2) five Regulin implants (5 imp). Two intact semen-tested Hampshire rams were shorn, weighed and their hooves trimmed prior to being introduced to the ewes on June 3.

¹Regulin, Gene Link Australia.
Ewes in the three-implant treatment received three implants, while those in the five-implant group received five implants, one every 10 days beginning June 11.

Ewes were fed 4.5 lb of a pelleted diet consisting of 74.5% corn cobs, 24.5% sun-cured alfalfa and 1% molasses per head per day. The ewes also received .25 lb of rolled corn in addition to the pellets. Rams received .25 lb of corn in addition to the ewes' diet. Free-choice trace mineralized salt was available for all treatment groups throughout the study.

Breeding marks were recorded daily on a scale of good, fair, poor and rape. The rams were greased daily prior to feeding just cranial to the sheath. Marking grease color (a combination of branding paint and yellow grease) was changed every 17 days to facilitate reading of marks. Rams and ewes were weighed every 28 days and at the end of the trial.

The trial was terminated August 23 (day 83) when the Hampshire rams were removed followed by introduction of Columbia clean-up rams. Data recorded at lambing consisted of date and time of birth, number, sex, weight and sire of lambs born.

Results

Initial and final mean ewe weights were similar (P>.05) between the three- and five-implant treatments. No difference (P>.05) was observed in ewe weight change between treatments, with 31.3 and 29.8 lb gains for the three- and five-implant groups, respectively (table 1).

The average number of days from ram introduction to first mark was similar between the two treatments, indicating that onset of cyclic activity was not improved in the five- versus the three-implant treatments. There were no differences (P>.05) for average number of breeding marks recorded for the three-implant treatment (1.35) and the five-implant treatment (1.47) [table 2].

The percentage of ewes lambing per ewe exposed as a result of treatment (bred during the trial period) did not differ (P>.05), with 90% and 79% lambing for the three- and five-implant treatments, respectively. No difference (P>.05) was observed in mean lambing date, with the three-implant ewes lambing with a mean day of 329 (November 25) and the five-implant ewes a mean day of 340 (December 5) [table 3]. All ewes that lambed in both the three- and five-implant treatments conceived during the 83-day trial period. Therefore, none lambed from use of the Columbia clean-up rams.

Based on these results, no advantage in reproductive performance was observed for five versus three Regulin implants.
### TABLE 1. EFFECT OF TREATMENT ON EWE WEIGHT CHANGE

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No.</th>
<th>Initial weight</th>
<th>Final weight</th>
<th>Weight change</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Imp</td>
<td>20</td>
<td>175*</td>
<td>206</td>
<td>31.3</td>
</tr>
<tr>
<td>5 Imp</td>
<td>19</td>
<td>168</td>
<td>198</td>
<td>29.8</td>
</tr>
</tbody>
</table>

* Weight in lb.

### TABLE 2. EFFECT OF TREATMENT ON AVERAGE DATE OF FIRST MARK AND NO. OF MARKS

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No.</th>
<th>No. of marks</th>
<th>No.</th>
<th>First mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Imp</td>
<td>20</td>
<td>1.35</td>
<td>15</td>
<td>19.7</td>
</tr>
<tr>
<td>5 Imp</td>
<td>19</td>
<td>1.47</td>
<td>14</td>
<td>24.1</td>
</tr>
</tbody>
</table>

### TABLE 3. EFFECT OF TREATMENT ON THE PERCENTAGE LAMBING, MEAN LAMBING DATE AND MEAN NUMBER OF LAMBS BORN

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No.</th>
<th>% lambing</th>
<th>Lambing date&lt;sup&gt;1&lt;/sup&gt;</th>
<th>No. b</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Imp</td>
<td>18</td>
<td>90</td>
<td>329</td>
<td>1.28</td>
</tr>
<tr>
<td>5 Imp</td>
<td>15</td>
<td>79</td>
<td>340</td>
<td>1.33</td>
</tr>
</tbody>
</table>

<sup>1</sup> Gregorian date. January 1 = 1.