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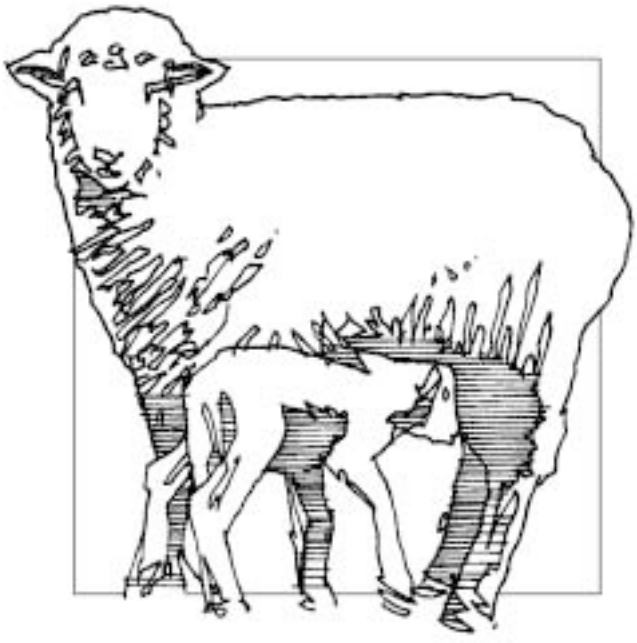

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Sheep Day 2000

EFFECTS OF MONENSIN TREATMENT OF EWE LAMBS, GENETIC TYPE, AND EWE AGE ON SUBSEQUENT EWE PRODUCTIVITY

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Summary

The data show that ewe lambs fed monensin in a weaning-to-market feeding trial had reduced (P<.05) conception rates as ewes. The effects of genetic type and ewe age were significant (P<.05) for other productivity traits measured: litter size and weight born, weaned, and marketed.

Introduction

Earlier research at a number of sites, including the Northwest Research-Extension Center of Kansas State University, demonstrated that monensin as a ration additive was beneficial to lamb growth rate. However, if monensin-fed ewe lambs are retained to become integrated into ewe flocks, the effects of monensin on their subsequent productivity need to be known. The literature did not yield any information.

The objective of this project was to determine if feeding monensin to ewe lambs did affect their productivity as ewes. The effects of genetic type and ewe age on productivity also were measured.

Experimental Procedures

In a weaning-to-market, lamb-feeding trial, groups of ewe lambs were either fed monensin at 10 gm per ton of feed or served as controls. Monensin-fed and control lambs were retained from the trial and then formed a flock that included Dorset x Rambouillet (DR) ewes, Finn x Rambouillet (FR) ewes and Suffolk x Rambouillet (SR) ewes.

The ewes were born in the fall and were bred to lamb in the spring at about 14-15 months of age. They then were bred to lamb in the following fall and remained on a fall-lambing schedule during the lifetime of the flock. The flock was terminated at the end of 7 production years.

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The ewes were managed in the routine manner for the Northwest Research-Extension Center flock. They were kept in a drylot from about 1month before lambing through lactation and were fed a ration of corn silage, alfalfa hay, and grain sorghum. Their newborn lambs were weighed and ear tagged for identification within 10 hours of birth. All lambs were docked, and male lambs were castrated at 7 to 10 days of age. Ewe and lamb families were intermingled through weaning (50 ± 3 days) with about 30 ewes and lambs per lot. At weaning, ewes were removed, and lambs remained in their original lots and were self-fed ground rations containing grain sorghum, alfalfa, soybean meal, and additives. As the lambs approached market size, they were weighed at 2-week intervals, and all lambs weighing 105 lbs or more were sold at the next sale in the local sale barn.

Methods of Data Analysis

Because the data consisted of repeated measures, analysis was performed in the following manner. First, a general linear mixed model was fit including all of the factors of interest, as well as interactions. Next, backwards elimination was used to eliminate all factors that did not significantly contribute to the model. The highest order interaction terms were deleted followed by the main effects, if those terms did not have a significance level less than 0.05. The remaining terms were included in the model. Finally, pairwise differences of the levels of the factors were measured according to Fisher's LSD method. Those pairwise differences that were significant at a 0.05 level were recorded.

All conception rate calculations were made by the MIXED procedure on the SAS® system, Version 8, and the analyses of conception rate data were calculated using the SAS macro "Glimmax, sas." This approach combines the MIXED procedure with data steps to analyze a repeated measures design with a binary response. The macro uses iteritively reweighted likelihoods* to fit the model.

Results and Discussion

The flock consisted of 68 ewes at the initiation of the lifetime production test. Thirty-six of those ewes had been fed monensin as lambs, and 32 served as controls. Throughout this report, they will be referred to as monensin ewes and control ewes or controls.

The monensin ewes accounted for 204 exposures to rams during the 7-year lifetime of the flock. Pregnancy occurred as a result of 164 of those exposures for an 80.4% conception rate. The 192 exposures of control ewes resulted in 168 pregnancies for an 87.5% conception rate. The difference of 7.1% was significant (P=.0358). We are not aware of other sheep research that would either corroborate or repudiate this significant difference in conception rate. Except for year 2, the conception data followed the generally accepted pattern of increasing productivity as the ewes aged to 4 years and then declining during the fifth, sixth,

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*Wolfinger, R. and O'Connell, M. 1993. Generalized Linear Mixed Models: A Pseudo-Likelihood Approach, Journal of Statistical Computation and Simulation 48.

and seventh years. Only 56.1% of the 2-year-old ewes exposed to rams conceived, making them significantly less successful when breeding than all of the other age groups. This low rate probably resulted because the ewes had lambed in the spring when they were 14-15 months old and had been rebred to lamb for their second lambing, in the fall, at 2 years of age. Although no significant interactions occurred between treatments and any of the ewe age groups, the data indicated that most of the difference in conception rate between the monensin and control ewes did occur during the first and second years (Tables 1 and 2).

Table 1. Conception rate by treatment and P values for comparisons between treatments.

					P Values	
Treatment	No. Ewe Exposures	No. Pregnancies	No. Open	% Conception	Monensin	Control
Monensin	204	164	40	80.4	XXX	
Control	192	168	24	87.5	.0358	XXX

Table 2. Conception rate by ewe age and P values for comparisons between ewe ages.

					P Values						
Age (yr)	No. Ewe Exposures	No. Pregnancies	No. Open	% Conception	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	68	58	10	85.3	XXX						
2	66	37	29	56.1	.0001	XXX					
3	65	59	6	90.8	NS*	.0001	XXX				
4	58	55	3	94.8	NS	.0001	NS	XXX			
5	55	50	5	90.9	NS	.0001	NS	NS	XXX		
6	46	41	5	89.1	NS	.0001	NS	NS	NS	XXX	
7	38	32	6	84.2	NS	.0008	NS	.0384	NS	NS	XXX

*NS = Nonsignificant

Litter size and litter weight data for the productive lifetimes of DR, FR, and SR ewes followed similar patterns from birth of the lambs through weaning and marketing. The data are presented in Tables 3-8.

Table 3. Litter size born by ewe breed and P values for comparisons between breeds.

		P Values		
Breed*	Litter Size	DR	FR	SR
DR	1.18	XXX		
FR	1.56	.0001	XXX	
SR	1.39	.0147	NS**	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet
**NS = Nonsignificant

Table 4. Litter weight (lb) born by ewe breed and P values for comparison between breeds.

		P Values		
Breed*	Weight Born	DR	FR	SR
DR	12.7	XXX		
FR	12.9	NS**	XXX	
SR	15.0	.0040	.0105	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet
**NS = Nonsignificant

Table 5. Litter size weaned by ewe breed and P values for comparisons between breeds.

		P Values		
Breed*	Litter Size	DR	FR	SR
DR	1.09	XXX		
FR	1.39	.0001	XXX	
SR	1.33	.0048	NS**	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet
**NS = Nonsignificant

Table 6. Litter weight (lb) weaned by ewe breed and P values for comparisons between breeds.

		P Values		
Breed*	Litter Weight	DR	FR	SR
DR	42.6	XXX		
FR	42.9	NS**	XXX	
SR	51.2	.0007	.0013	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouilllet
**NS = Nonsignificant

Table 7. Litter size marketed by ewe breed and P values for comparisons between breeds.

		P Values		
Breed*	Litter Size	DR	FR	SR
DR	1.07	XXX		
FR	1.39	.0001	XXX	
SR	1.33	.0010	NS**	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet
**NS = Nonsignificant

Table 8. Litter weight (lb) marketed by ewe breed and P values for comparisons between ewe breeds.

		P Values		
Breed*	Litter Weight	DR	FR	SR
DR	118.3	XXX		
FR	145.2	.0001	XXX	
SR	144.1	.0031	NS**	XXX

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet
**NS = Nonsignificant

The FR and SR ewes gave birth to more lambs, weaned more lambs, and had more lambs go to market than did the DR ewes. Although no significant differences occurred between the two groups, FR ewes did have a slight numerical advantage over SR ewes at each production point. Litter size was greatest for the FR ewes, but litter weight was heaviest for the SR ewes, indicating that individual lambs born to SR ewes must have been larger. No differences occurred in litter weight born or weaned between FR and DR ewes, suggesting that individual lambs from FR ewes were also smaller at birth and at weaning than those born to DR ewes. The litter weight difference between FR and SR ewes no longer existed at market, when total weight was more a function of litter size. The FR and SR ewes both had more lamb weight marketed than did the DR ewes.

As the ewes aged, their productivity generally followed an expected pattern of increasing from yearling to 4-year-old ewes and then tapering off during years 5, 6, and 7 of their ewes lives (Tables 9-14). One exception to the rule was litter size; 1.23 lambs were born to the 2-year-old ewes compared with 1.41 lambs born to yearling ewes. Because the ewes lambed first at 14-15 months of age, that lambing occurred in the spring, which is the natural time. The 2-year-old ewes lambed in the fall (out of season) after lambing in the previous spring, which probably accounted for the smaller litter size.

Table 9. Litter size born by ewe age and P values for comparisons between ages.

		P Values						
Ewe Age (yr)	Litter Size	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	1.41	XXX						
2	1.23	NS*	XXX					
3	1.57	NS	.0006	XXX				
4	1.61	.0234	.0002	NS	XXX			
5	1.52	NS	.0045	NS	NS	XXX		
6	1.23	NS	NS	.0004	.0001	.0034	XXX	
7	1.07	.0013	NS	.0001	.0001	.0001	NS	XXX

*NS = Nonsignificant

Table 10. Litter weight (lb) born by ewe age and P values for comparisons between ages.

		P Values						
Ewe Age (yr)	Weight Born	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	11.4	XXX						
2	11.5	NS*	XXX					
3	14.6	.0001	.0001	XXX				
4	16.6	.0001	.0001	.0011	XXX			
5	15.0	.0001	.0001	NS	.0085	XXX		
6	13.2	.0056	.0208	.0240	.0001	.0077	XXX	
7	12.3	NS	NS	.0010	.0001	.0003	NS	XXX

*NS = Nonsignificant

Table 11. Litter size weaned by ewe age and P values for comparisons between ages.

		P Values						
Ewe Age (yr)	Litter Size	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	1.16	XXX						
2	1.20	NS*	XXX					
3	1.46	.0010	.0123	XXX				
4	1.56	.0001	.0010	NS	XXX			
5	1.38	.0231	NS	NS	NS	XXX		
6	1.13	NS	NS	.0008	.0001	.0147	XXX	
7	1.00	NS	NS	.0001	.0001	.0007	NS	XXX

*NS = Nonsignificant

Table 12. Litter weight (lb) weaned by ewe age and P values for comparisons between ages.

		P Values						
Ewe Age (yr)	Litter Weight	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	36.4	XXX						
2	41.0	NS*	XXX					
3	48.1	.0001	.0058	XXX				
4	50.6	.0001	.0003	NS	XXX			
5	52.6	.0001	.0001	.0458	NS	XXX		
6	45.3	.0005	NS	NS	.0360	.0035	XXX	
7	44.7	.0025	NS	NS	.0337	.0039	NS	XXX

*NS = Nonsignificant

Table 13. Litter size marketed by ewe age and P values for comparisons between ages.

		P Values						
Ewe Age (yr)	Litter Size	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	1.14	XXX						
2	1.19	NS*	XXX					
3	1.44	.0005	.0107	XXX				
4	1.53	.0001	.0007	NS	XXX			
5	1.34	.0203	NS	NS	.0444	XXX		
6	1.17	NS	NS	.0048	.0002	NS	XXX	
7	1.06	NS	NS	.0002	.0001	.0063	NS	XXX

*NS = Nonsignificant

Table 14. Litter weight (lb) marketed by ewe age and P values for comparisons between ewe ages.

		P Values						
Ewe Age (yr)	Litter Weight	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr
1	119.2	XXX						
2	121.8	NS*	XXX					
3	156.9	.0001	.0013	XXX				
4	167.8	.0001	.0001	NS	XXX			
5	144.2	.0124	.0475	NS	.0221	XXX		
6	125.1	NS	NS	.0025	.0001	NS	XXX	
7	116.0	NS	NS	.0003	.0001	.0163	NS	XXX

*NS = Nonsignificant

After 7 years of production, the flock was terminated (Table 15). At that time, 54.4% of the ewes remained in the flock as productive ewes. Most of the losses were due to culling because of spoiled or unsound udders. Culling of ewes as non-lambers for being open twice in succession was the second most likely reason for ewes to leave the flock. Bad udders were most common (10) in FR ewes and somewhat more numerous in control (8) than monensin (5) ewes. Non-lambers were more common among monensin (6) than control (3) ewes, which was most likely a reflection of the difference in conception rate. None of the final disposition data were analyzed statistically.

Table 15. Final disposition of ewes: overall, by ewe breed, and by treatment.

			Ewe Breed*			Treatment	
Disposition	Total No.	Percent	DR*	FR	SR	Rumensin	Control
Flock termination	37	54.4	20	10	7	20	17
Non-lamber	9	13.2	3	2	4	6	3
Unknown	5	7.4	3	2	0	4	1
Bad udder	13	19.1	2	10	1	5	8
Physical trauma	3	4.4	1	2	0	1	2
Poor condition	1	1.5	1	0	0	0	1
Ewe totals	68	100.0	30	26	12	36	32

* DR = Dorset x Rambouillet
FR = Finn x Rambouillet
SR = Suffolk x Rambouillet

NOTE: Trade names are used to identify products. No endorsement is intended, nor is any criticism implied of similar products not named.

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