

Hip height growth rates were similar for all breeds from weaning to yearling. However, a yearling hip height measurement is probably a more accurate growth indicator since maternal preweaning influences should have less drastic effects on frame size.

Literature Cited

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Factors Related to Ram Fertility During May and June

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Story in Brief

A flock of 160 Rambouillet ewes was purchased to combine with existing ewes to create 10 test groups to be used to measure the breeding effectiveness (aggressiveness and fertility) of rams. Two rams that showed little response in testicular circumference to the season of the year and two rams that responded strongly were tested to determine if this measurement was related to ram effectiveness in May and June. Three pairs of twin rams were used to determine if subjecting rams to reduced light for about 2 months before the breeding season would affect breeding effectiveness. One ram of each pair was subjected to reduced light, and one received normal light prior to the May-June breeding season. The rams selected to be more fertile on the basis of testicular size made considerably more matings and therefore sired more lambs than those thought to be less fertile, but so few rams were tested that cautious optimism prevails about the possibilities of using this procedure. The rams that were subjected to only 8 hours of light daily before breeding produced slightly higher conception rates than rams exposed to normal light, but the evidence that this was due to restricted light is inconclusive.

Introduction

Successful fall lambing is the result of an effective late spring (May-June) breeding season. Many sheepmen who attempt to lamb their ewes during the fall

do not experience a high level of success as judged by the percent of the ewes that lamb (fertility) or the number of lambs born per ewe lambing (prolificacy), suggesting that the breeding season the previous spring was not very effective.

An effective breeding season results when fertile and aggressive rams are exposed to ewes, all of which are cycling regularly. Since ewes of only a few breeds or breedcrosses of sheep (Dorsets, Rambouillets, Dorset \times Rambouillet crosses) cycle reasonably well during the spring, it is common to blame the ewes when breeding failures occur. Mating records have been maintained routinely on the experimental sheep flock at the Southwest Livestock and Forage Research Station near El Reno since 1955. These records indicate large differences in breeding effectiveness of different rams when exposed to the same kind of ewes. They also indicate that most rams are much more effective during the fall than during the spring. Similar observations have been noted by sheep producers and by scientists at other research locations.

The use of light control to reduce the amount of light to which sheep (ewes or rams) are exposed has been shown by several scientists to cause seasonally infertile (or less fertile) ewes and rams to become more fertile. If the more fertile rams could be detected, or if a practical system of light control would make rams generally more effective under spring breeding conditions, it should result in more effective spring breeding followed by more successful fall lambing.

The purpose of this report is to give some preliminary results obtained from research designed to estimate the improved breeding performance of rams subjected to light control and the differences in performance of untreated rams selected on the basis of testicular measurements to be *more* vs *less* fertile.

Experimental Procedure

The most accurate method of measuring a ram's fertility is to expose him to enough ewes to measure the speed with which he mates with them and the percent of pregnancies resulting from the matings. One hundred sixty Rambouillet ewes were purchased to combine with the existing flock so that mating groups could be created to test 10 rams per year. The flock ewes that were placed with the Rambouillets included F_2 Dorset \times Finn crossbreeds, Dorset \times Rambouillet ewe lambs and old Dorset \times Rambouillet ewes. The 10 mating groups were balanced to contain the same proportion of ewes of each breed cross and age group.

The rams to be tested involved two kinds of tests. One test concerned the ability to select *more* vs *less* fertile rams on the basis of testicular size measurements. The second was concerned with whether reduced light prior to the breeding season would increase the breeding effectiveness of Dorset \times Finn F_2 rams.

The possibility of selecting rams for fertility based on testicular size (scrotal circumference) is based on the idea that testicular size follows a rhythm during the year with a larger size prior to and during the regular breeding season and smaller size prior to and during the period when rams are infertile or less fertile (the period when seasonally anestrous ewes will not breed). The period of lowest fertility varies with different animals and different breeds but is some time between late winter and late summer. Since some rams are much more fertile and sexually aggressive during this period than others, the question arises, "Do these rams show the usual reduction in testicular size during this period?" To test this idea a group of Dorset \times Finn yearling rams were measured monthly for a year to characterize their individual testicular size changes prior to the May-June 1981 breeding season. From this group two rams were selected as showing the least

response to season in testicular size, and two were selected as showing the most response. Each of these four rams was placed with one of the test groups of ewes for breeding.

To test for the effect of reduced light on breeding effectiveness, seven Dorset × Finn yearling rams were placed on a schedule of 8 hours of light and 16 hours of dark for the last 10 weeks prior to the 1981 May-June breeding season. An equal group of the same kind of rams was maintained under normal light conditions for the same period of time. The 14 rams included three pairs of twins with one ram of each pair in each group. These six rams were tested for fertility by mating each with a test group of ewes.

The breeding season was from May 5 to June 30. Each group of ewes with the ram to be tested was in a different pasture containing similar grazing opportunities. The rams were fitted with marking harnesses to monitor mating activity. The ewe groups were observed daily or on alternate days, and the mating marks (indicating possible matings) were recorded. One of the rams in the groups that received normal light prior to the breeding season would not mate and was replaced 10 days after the breeding season began in order to get the ewes bred.

Results

These results must be considered very preliminary because only a few rams have been tested in one year. The data show promise at this point, and we are encouraged.

The performance of the rams whose fertility was predicted from testicular size changes is shown in Table 1. The percent mated column is a measure of the aggressiveness of the rams. It is obvious that the two rams predicted to be more fertile were more aggressive. They not only found and marked a higher percentage of their ewes; they also made about 40 percent more total matings

Table 1. Measures of breeding effectiveness of rams selected to be more or less fertile based upon testicular size changes

Predicted fertility	No. ewes	% mated	Conc. ^a rate (%)	Lambing ^b rate	Lambs/ewe exposed
More fertile					
1	29	100	66	1.26	.83
2	29	93	81	1.32	1.00
Less fertile					
1	27	78	67	1.29	.67
2	28	71	60	1.25	.54

^a Percent of mated ewes that conceived.

^b Lambs born per ewe lambing.

(not shown) as indicated by recorded rump marks. The rams predicted to be more fertile were especially more effective in finding and mating with the less sexually active ewes—the Dorset × Finn and the Dorset × Rambouillet ewe lambs.

The conception rate is the percent of the mated ewes that lambed and shows only a slight advantage for the rams predicted to be more fertile. The lambing rate is the number of lambs born per ewe lambing and shows no important trend. The lambs per ewe exposed favors the rams predicted to be more fertile and

results largely from their aggressiveness in mating with a higher percent of their ewes. These data suggest that the rams whose testicular size changes showed the least seasonal effect were more effective because they were more aggressive in finding and mating with the ewes in their flock.

The breeding effectiveness of the rams on the light control test is presented in Table 2. A study of this table suggests that the results are quite inconclusive. Two of the pairs of rams (1s and 2s) responded similarly whether they were subjected to normal light or were exposed to light restriction. The two number 3 rams were twins also. The one on light control certainly performed better than his twin on normal light, but there is no way to prove that the light control caused the difference. If the two number 3 rams are ignored, the other rams performed similarly except that a higher percent of the ewes that were mated to twins on light control became pregnant. This test needs to be and will be repeated.

Table 2. Measures of breeding effectiveness of rams subjected to 8 hours of light vs normal day length prior to the May-June breeding season

Light treatment	No. ewes	% mated	Con. ^a rate (%)	Lambing ^b rate	Lambs/ewe exposed
8 hr light					
1 ^c	29	97	75	1.14	.83
2	27	100	74	1.30	.96
3	28	82	65	1.40	.75
Normal light					
1 ^c	29	97	68	1.42	.93
2	28	96	67	1.33	.88
3 ^d	27	15	25	1.00	.04

^a Percent of mated ewes that lambled.

^b Lambs born per ewe lambing.

^c The two rams with the same number were twins.

^d This ram replaced after 10 days because of failure to make enough matings.