Ewe Weight and Condition at Breeding Time as Related to Mating Performance and Reproductive Rate

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Story In Brief

The prebreeding weights and condition scores, mating behavior and reproductive performance of about 250 ewes involved in 8 breeding and lambing seasons over a 6-year period were studied in an effort to determine what interrelationships existed among the traits.

The relationships between breeding weights and scores and reproductive rate were of special interest. Differences in weights of different breeding groups bore no relationship to reproductive rate. However, when breed was ignored, it was found that ewes producing triplets were a little heavier than ewes producing twins, which in turn were a little heavier than ewes producing singles. Relative to the relationship of any prebreeding condition score with reproduction, the results were very dependent upon which season was involved. There was a strong tendency for fatter ewes to be more likely to conceive during the spring season and produce more lambs as compared to the thinner ewes. There appeared to be no clear relationship between the condition score and fertility or lambing rate (prolificacy) when mating was in September and October. When the breeding season was in January and February, the conception rate was high, and there was little evidence of a relationship with condition score. In contrast, there was a strong relationship between score and lambing rate with ewes scoring 4 or below producing at a considerably lower rate than those scoring higher.

Mating behavior as indicated by days to first estrus or days to conception did not appear to be related to weight or condition score but indicated a tendency for more prolific ewes to be more fertile when the breeding seasons began.

Introduction

Many opinions exist about the relationships between the weight and condition of ewes at breeding time and their reproductive performance. With reproductive rate the most important contributor to a successful sheep operation, it is obvious that any knowledge leading to a better understanding of the reproductive process might aid in developing better management practices. During the period from 1974 until 1979, a flock of ewes was managed in an intensive lambing program at the Southwest Livestock and Forage Research Station (Ft. Reno) near El Reno, Oklahoma. The flock represented five kinds of crossbred ewes, which were quite variable in weight and condition and were bred at different times during the year. They also varied widely in reproductive rate.

This study represents an effort to relate the weight and condition (degree of fatness) of the ewes of different breed crosses at breeding time to their mating behavior and reproductive rate during the different seasons.

Materials and Methods

The ewes involved in the study were various crosses of Finnish Landrace (F), Dorset (D) and Rambouillet (R) that were produced and raised at the station during 1971 and 1972. The five crosses and the initial numbers in each group were½D½R (55), ¼D3/4R (59), ¼F½D¼R (54), ¼F¼D½R (56) and ¼F3/4R (39). During 1972, 1973 and 1974 the ewes lambed during the early spring or winter. They were then switched to a fall lambing program and lambed during the fall in 1974 and 1975. This was followed by four years of accelerated lambing with a winter (Jan.-Feb.) breeding season followed by an early fall (Sept.-Oct.) breeding season followed by a late-spring (May-June) breeding season. The data for this report came from the seasons beginning with the May-June breeding season of 1974, at which time the younger ewes were about 26 months old, and ending with the May-June season of 1979 when the ewes were 8 or 9 years old.

The ewes were mated to yearling or 2-year-old Hampshire, Suffolk or blackfaced crossbred rams in single ram breeding pastures containing between 30 and 36 ewes per pasture. The mating seasons were of about 45 days duration. The ewes were examined each morning, and those with fresh chalk marks recorded.

Prior to allottment to the breeding pastures, the ewes were individually weighed and scored for condition. The scoring was on a 9-point scale where scores 1,2 and 3 were for thin ewes (extremely emaciated to thin, but strong) 4, 5 and 6 were ewes in average condition (a bit of fat over the fore rib and rump to considerable fat in these areas) and 7, 8 and 9 were for fat ewes (from a moderate cover to extremely fat). During the last 4 years of the study under accelerated lambing, most of the ewes scored from 2 to 7 prior to breeding.

Careful records were kept at lambing, and in seasons when there were many twins and some triplets, most of the ewes raised two lambs. The lambs were creep-fed and weaned at about 10 weeks of age except that a few late-born lambs were weaned as early as 7 weeks to allow their mothers to go into the breeding pastures on schedule. (There was no detectable relationship between the time during the lambing season when a ewe lambed and whether or when she conceived during the subsequent breeding period.)

The mating records of interest were 1) days to first mating and 2) days to conception. The first is an indication of the cycling behavior of the ewes when the breeding season started. If the ewes are all cycling, the average days to first mating should be about 8 or 9. Larger numbers mean that some ewes were not cycling but started during the mating period. Days to conception considered with days to first mating is an indication of conception rate. If all ewes conceive at their first mating, the two values will be the same. The larger the difference between the values, the lower the conception rate.

Results

The information in Table 1 is presented to show the average values as they existed at the different breeding periods and the reproductive rate resulting from breeding at those times. The values for the May-June season are the averages over all breeding groups for 4 years. The averages for the other two seasons are also from all breeding groups but for only 2 years each. It can be seen that the average weight of the ewes did not vary appreciably between seasons even though the ewes scored thinner just before the Sept.-Oct. breeding season. The average days to first mating were the same for the Sept.-Oct. and Jan.-Feb. seasons and indicated that practically all of the ewes were cycling at the beginning of the breeding season. The value of 15 for the May-June season indicated that many of the ewes were not cycling when the breeding season began.The average days to conception shows that the conception rate was very high in

Table 1. Average weights, scores, days to first mating, days to conception, fertility and lambing rate by season of breeding for the ewes in the study

	May-June	Sept.-Oct.	Jan.-Feb.
No. ewe records	896	419	435
Av. weight (lb)	140	144	147
Av. score	5.4	3.9	5.2
Days to 1st mating	15	9	9
Days to conception	23	19	10
No. not mating	87	15	5
Percent lambing	60.5	87.3	92.3
Lambing rate	1.43	1.77	1.66

Jan.-Feb. The value for Sept.-Oct. shows relatively poor conception, but part of this was due to rams infected with epididymitis during one fall breeding season. The conception rate was not as high during the other season when there was no health problem as it was during the winter breeding period, however. The value of 23 for the May-June period results from both fewer ewes cycling at the beginning of the breeding season and a lower conception rate of those cycling, indicating a generally lower level of fertility in the flock during the late spring season. Percent ewes lambing was good from Sept.-Oct. and Jan.-Feb. and low from May-June mating. Lambing rate was highest from Sept.-Oct. mating, lower but still pretty good from Jan.-Feb. mating and low from May-June mating. The number of ewes not mating also reflects the generally lower fertility during late spring.

Any effort to find a relationship between ewe weight and/or score and reproductive performance on a seasonal basis, i.e., from the values in Table 1, appears fruitless. Ewe weights were similar during the different breeding seasons, and condition scores were lowest prior to the most productive (most lambs) breeding season.

The data were considered on the basis of the breed of the ewes. These data are presented in Table 2. The values for the different ewe groups are the average over all lambing seasons. A study of the values shows that the different breed groups were similar in condition but varied considerably in weight. The Dorset x Rambouillet crossbred ewes were lightest in weight but were the most fertile. The ¼ Dorset 3/4 Rambouillet ewes were among the heaviest and were least prolific due probably to too much Rambouillet breeding. These differences are a reflection of the different characteristics of the breeds involved relative to fertility (percent ewes lambing) and prolificacy (lambs born per ewe lambing.) When considered over all seasons, there were no important differences in the average mating behavior of the various breed groups.

Table 2. Average weights, scores, days to first mating, days to conception, fertility and lambing rate for the different crossbred ewe groups

	½D½R	¼D3/4R	¼F½D¼R	¼F¼D½R	¼F3/4R
No. ewe records	392	444	327	393	276
Av. weight (lb)	131	149	140	144	149
Av. score	4.9	5.0	5.1	5.0	5.1
Days to 1st mating	11.6	12.4	11.2	12.2	13.4
Days to conception	18.0	18.2	17.4	18.6	18.0
Ewes not mating	18	22	19	28	20
Percent lambing (fert.)	80.4	76.2	72.0	69.8	73.0
Lambing rate (prolificacy)	1.56	1.46	1.65	1.71	1.62

The next summary considered was an examination of the weights, scores, and mating behavior of ewes that had different numbers of lambs. These values are presented in Table 3 and represent the averages of all seasons. There were 6 sets of triplets born from the 896 ewes mated during May-June compared to 17 from 435 ewes mated during Jan.-Feb. and 34 from 419 ewes mated during Sept.-Oct. These data show that for the ewes that lambed, there was a tendency in all breeding groups for ewes producing triplets to be heavier but no fatter at breeding time and to gain more weight before lambing than ewes producing twins, which were in turn larger and gained more than ewes producing singles. Ewes not lambing weighed about the same as those producing twins and singles and were in about the same condition. Perhaps the most significant values in Table 3 are those reflecting mating behavior and conception. There was a relationship between number of lambs produced and days to mating and conception. The data strongly suggest a relationship between fertility (willingness to mate at the beginning of the breeding season) and prolificacy (lambing rate). More fertile ewes also tend to be more prolific. Most of the ewes that did not lamb were not cycling at the beginning of the breeding season but did mate before the season was over.

These summaries have not shown any pattern of relationship between the condition score of the ewes at breeding and their mating behavior or reproductive rate. To determine if such a relationship existed within the breeds or seasons, a summary was done by sorting the data on a breeding score basis. Table 4 illustrates the relationship between scores and weights prior to the three breeding seasons. It is obvious that there is a strong relationship. Since any fat that an animal has stored is a part of the animal's weight, the fatter animals weighed more. The animals scored as thin (1-3) generally averaged between 100 and 140 pounds with some variation between seasons. Ewes in average condition (scores 4-6) tended to weigh between 130 to 160. Ewes scored as fat (7-8) generally averaged from 160 to 180.

Table 3. Average breeding and lambing weights and scores and days to first mating and conception for ewes producing triplets, twins, singles and no lambs

Item	Triplets	Twins	Singles	No lambs
No. ewes	57	664	575	536
Brdg. wt. (lb)	153	144	140	143
Lmbg. wt. (lb)	177	167	161	151
Brdg. score	4.9	5.1	5.0	5.0
Lmbg. score	4.9	5.3	5.4	5.2
Days to 1st mating	7.7	10.7	12.4	14.4
Days to conception	12.4	16.4	20.1	—

Table 4. The relationship between prebreeding condition score and weight of the ewes for the three seasons

Breeding Score	May-June		Sept.-Oct		Jan.-Feb.	
	no.	wt.	no.	wt.	no.	wt.
1	8	108	12	117	4	118
2	31	123	77	129	18	125
3	68	134	125	139	51	127
4	79	132	79	151	63	140
5	205	130	33	149	87	143
6	308	142	49	154	109	153
7	172	157	36	166	86	161
8	20	170	6	181	7	174

Relationships between prebreeding scores and reproductive performance were of greatest concern. These summaries are presented in Table 5 for the three seasons because there appeared to be different relationships in the different seasons. During the May-June breeding season the thin ewes were lower in both fertility and prolificacy, suggesting that better feeding prior to breeding might have improved reproduction. There was a suggestion that a score of about 6 was best for fertility and a score of 8 best for prolificacy during the spring breeding season. This breeding season followed the heaviest lambing season (winter), and it is possible that more feed would have aided recovery from lactation and preparation for breeding.

During the September-October breeding season there was no clear relationship between the score and either fertility or prolificacy. The low fertility of the ewes scoring 8 only involved six ewes and could easily have been due to chance although ewes scoring 8 were lower in fertility during all seasons. It has been observed previously in other data that fat ewes more often have lower conception rates and high lambing rates for those that do lamb.

Table 5. The reproductive performance of ewes with varying condition scores prior to the three breeding seasons

Breeding	May-June			Sept.-Oct.			Jan.-Feb.		
Score	No.	Fert.	Prolif.	No.	Fert.	Prolif.	No.	Fert.	Prolif.
1	8	12.5	1.00	12	66.7	1.63	4	100.0	1.75
2	31	29.0	1.22	77	76.6	1.85	18	94.4	1.41
3	68	36.8	1.32	125	76.0	1.73	51	94.1	1.50
4	79	50.6	1.35	79	78.5	1.68	63	95.2	1.53
5	205	62.9	1.43	33	66.7	1.68	87	89.7	1.68
6	308	68.2	1.45	63	69.4	1.85	109	96.3	1.75
7	172	58.7	1.46	36	72.2	1.92	86	90.7	1.82
8	20	45.0	1.67	6	33.3	2.00	7	71.4	2.20

During the January-February breeding season fertility was high as indicated previously. The summaries by score in Table 5 show no strong relationship between score and fertility except the previously-noted lower fertility of the few ewes scoring 8. There does appear to be a relationship between score and lambing rate. Ignoring the value for score 1 (4 ewes), there is a distinctly lower lambing rate from ewes scoring 4 or lower. This suggests that better feeding of thin ewes to be bred during early winter might be beneficial.

This summary of the records by score of the ewes prior to breeding also included the average days to first mating and days to conception. There did not appear to be any relationships between score and these values except those noted in Table 1 between season and days to first mating and conception.