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Four-Year Summary of Accelerated Lambing Program

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Summary

Rambouillet ewes at Purdue University have averaged 2.32 lambs born and 1.96 lambs raised yearly over a four-year period. This was accomplished through an accelerated lambing program in which the ewes produced a lamb crop every eight months or a total of six crops in four years.

During this period the average 120 day weight of the lambs has increased 39 per cent and the average ewe production index, which combines lamb weights and ewe fleece weights, has increased 21.4 per cent. The percentage of lambs raised, the birth weight of the lambs and the fleece weight of the ewes have not been reduced by this acceleration of the reproductive cycle.

Lambs were born in January, September and May. The productivity of the ewes was greatest in January and the lowest in September with May being intermediate between these two seasons.

Nine ewes completed the full cycle of six lamb crops in four years. They showed an increase of 47 per cent in the 120 day weight of the lambs, a 27 per cent increase in the ewe production index and a 55 per cent increase in the percentage of lambs raised during this period. These ewes averaged 2.30 lambs born and 2.06 lambs raised yearly. There was a slight advantage in terms of percentage of lambs raised, lamb weights at 120 days and ewe production index for the January lambing over the May lambing and both were better than the September lambing.

This study demonstrates that the reproductive efficiency of Rambouillet ewes can be increased over a period of years by accelerating their reproductive cycles. This has been accomplished on a natural selection basis without the use of exogenous hormones and has resulted in more pounds of lambs marketed per ewe yearly. The procedures followed in this study offer possibilities to those interested in increasing the productivity of ewes.

Introduction

The purebred Rambouillet flock of sheep at Purdue University has been kept on an accelerated lambing program for a four-year period from 1964 to 1968. During this period they have produced a lamb crop every eight months without the use of exogenous hormones to promote or synchronize estrus. This flock lambed in September of 1964, May of 1965, January of 1966, September of 1966, May of 1967 and January of 1968. Thus they have produced six crops of lambs in a four-year period, an increase of 50 per cent over the normal once-a-year lambing.

Procedure

The May and September lamb crops were born on pasture, but the January lambs needed the normal care and attention necessary during the colder season of the year. The flock was maintained under normal management conditions with the ewes receiving additional energy feeds during the last month of gestation and the first

1/ Appreciation is expressed to James A. Osborn, shepherd, Gary Coots and James Brown for their assistance in conducting this study.

two months of lactation. Pasture furnished the principle source of roughage for the May and September lambings and a grass-legume haylage was used during the winter feeding period. When available, Reed wheat was used for early spring and late fall pasture and sudan grass was used during the mid-summer months.

During the four-year period, the lambs were weaned at approximately 60 days of age to permit a termination of the ewe's milk production prior to breeding for the next lamb crop. Lambs had access to a creep containing a high energy lamb creep pellet until weaning and the Purdue 58 lamb pellet from weaning to 120 days of age. The formula for the Purdue 58 lamb pellet is given in Purdue University Cooperative Extension Publication AS-367. The lambs born in May and September remained with the ewes on pasture until they were weaned at 60 days of age. They were then fed in dry lot until they reached 120 days of age. Lambs born in January remained in dry lot for the entire 120 days. None of these lambs have been forced to gain at high rates since ewes and rams have been selected for replacements from each lamb crop.

Flock numbers were maintained by selecting young ewes from different lambing seasons to replace ewes which were culled due to age, udder unsoundness or lowered productivity. These replacement ewes were well grown out and bred at 18 months of age, producing their first lambs when approximately two years old. The flock size varied from 32 to 39 through the first five lambing periods but was increased to 48 in January of 1968 by the addition of a larger number of yearlings in the summer of 1967. The average age of all ewes for the four-year period was 3.8 years, but many ewes have remained productive in the flock until the age of 9.

The first three lamb crops were sired by two horned Rambouillet rams raised in the flock. The second three lamb crops were sired by a polled ram purchased from the University of Illinois. Replacement ram lambs will be used as sires of future lamb crops according to their performance and progeny records. All of these sheep are purebred Rambouillets and are registered in the flock book of the American Rambouillet Sheep Breeders Association.

A preliminary summary for the first three lambing periods in the accelerated program was reported in the Indiana Sheep Day Report of June 25, 1966. The present report summarizes the data on six lambing periods involving two complete accelerated cycles at three different seasons of the year.

Results and Discussion

The four-year production summary for the six lambing periods is given in Table 1.

These data indicate that approximately 90 per cent of the ewes remained on the accelerated program during this period. If a ewe failed to lamb, she was bred four months later for the next lambing period. This is one of the advantages of the program since an entire year is not lost as with the once-a-year program.

During the four-year period, there has been no decrease in the productivity of the ewes due to the acceleration of their reproductive cycles. The number of lambs born and the number raised has been maintained as well as the birth weight. There has been a steady increase in the average 120 day weights of the lambs from 59.6 pounds in the fall of 1964 to 82.9 pounds in the winter of 1968, an increase of 23.3 pounds per lamb or 39 per cent. The total 120 day lamb weight per ewe has likewise increased. Fleece weight and grade have been maintained and the ewe production index has increased 21.4 per cent. This index is calculated by combining the average 120 day weight of the lambs and the fleece weight of the dam

(multiplied by 3). Adjustments are made for multiple births, sex of lambs and age of dam. This index is explained in the Purdue University Cooperative Extension Publication AS-269.

There appears to be some variation in the data due to the effect of seasons. This is shown in Table 2.

A higher percentage of the ewes settled and lambed in the winter period than in either the spring or fall. The lowest percentage lambed in the fall although the difference was not great. The percentage of lambs born and raised also favors the winter lambing period, but a greater lamb loss was experienced in the winter, probably due to weather conditions. The lowest lamb loss was during the spring lambing period.

The average 120 day weights of the lambs, the average daily gain of the lambs and the total 120 day weights of lambs per ewe also favor the winter lambing period. These are reflected in the ewe production index for the three seasons.

A number of management problems, which vary with seasons, may account for these differences. Lambs dropped in the fall are usually weaned at the time when they must make adjustments for cold weather. They do not make as much gain in weight or adapt as readily to changing conditions as do winter or spring lambs. Particular attention needs to be given to the creep rations for both the fall and winter lambs since they have higher maintenance requirements than spring lambs due to the cold weather.

Spring lambs present some problems that are not found with the fall and winter lambs. They must be examined closely, following docking and castration to prevent maggot infestation. For this reason, in this study no ram lambs were castrated in May of 1965 or 1967. Spring lambs are particularly susceptible to internal parasite infestation which they obtain from the ewes while on pasture. It was more difficult to control parasite infestation in this lamb crop than in either the fall or winter lambs. Therefore, the growth rate of spring lambs was reduced during the hot summer months compared to winter lambs.

During the four years of 1964-68 the number of ewes lambing have averaged 34.5 for each of the six lambing periods for a total of 138 ewe years. They have produced a total of 321 lambs or 2.33 per ewe year. Of this number, 271 have been raised to 120 days or 1.96 per ewe year. This illustrates the yearly potential productibity of a ewe flock under the accelerated lambing program. If 1.4 lambs can be raised per lambing period, it is possible to average at least 2 lambs raised per year.

During the four-year period, 1964-68, some of the older ewes were culled before they had produced six crops of lambs and many of the younger ewes were added to the flock after 1964. However, nine ewes completed the full cycle of six lamb crops in four years. The four-year production summary for these nine ewes is shown in Table 3.

The data in Table 3 show that these nine ewes were able to maintain productivity through the six lambing periods of the accelerated program in a satisfactory manner, which was similar to the entire flock. The composition of the flock changed due to normal management procedures involving the culling and replacement of ewes to maintain productivity. The most noticeable change occurred in the average 120 day weight of the lambs which increased from 57.7 pounds in the fall of 1964 to 84.9 pounds in the winter of 1968. This is an increase of 27.2 pounds or 47 per cent and resulted in better than 50 per cent increase in average daily gain from 0.39 to 0.60 for the four-year period. These weights and gains are reflected in a corresponding increase in the ewe production index. While some of this increase in the weight of the lambs may be attributed to an improvement in management and nutrition, it does indicate that productivity in the accelerated program does not

diminish under good management conditions. Maintenance of the birth weight of the lambs and the fleece weight of the ewes tend to support this conclusion.

Seasonal variation is apparent in the data shown in Table 4. There was very little difference in productivity between the winter and the spring lambing periods with the exception of the percentage of lamb loss which was greater in the winter period. There were less lambs born and raised in the fall lambing period and their 120 day weights were lower than those born in the winter or spring. This is reflected in a lower ewe production index for the fall lambing period. These differences cannot be attributed to genetic variation since the same ram sired all of the lambs in the last three seasons and two rams each sired half of the lambs in the first three seasons.

When all of the data for the six lambing periods for the nine ewes are combined, these ewes produced 2.31 lambs and raised 2.06 lambs per ewe year, which is slightly better than the record for the entire flock reported in Table 2.

Future Plans

Since this Rambouillet flock has performed well under the accelerated lambing program, it will be continued as a demonstration flock in the future. Performance records will be collected under a production testing program as in the past. An attempt will be made to have 100 per cent of the ewes lamb regularly at each lambing period. Replacement ewe lambs will be selected only from ewes that have this ability. While considerable improvement has been obtained in the weight and gain of the lambs to 120 days of age, additional improvement should be possible through the use of the ewe production index. This index reflects lamb weights, and fleece weight and gives additional credit for twinning ability. Thus it is hoped that both the fleece weight and the percentage of lambs raised can be increased also.

In the past, there has been little opportunity to compare the genetic potential of different rams, since the size of the flock has not warranted the use of more than one ram. With an increase in ewe numbers, it will be possible to progeny test more than one ram, and it is hoped that additional data on carcass quality can be obtained. The September 1968 lamb crop will be sired by four young rams, each bred on a random basis to one quarter of the ewe flock. Replacements will be retained from the best producing ram, thus permitting additional improvement through the sire as well as through the best producing ewes.

Table 1. Four-year production summary a/

Item	Unit	Fall 1964	Spring 1965	Winter 1966	Fall 1966	Spring 1967	Winter 1968
No. ewes exposed	No.	39	37	32	39	37	48
No. ewes lambing	No.	34	31	30	33	34	45
% of exposed ewes lambing	%	87.2	83.8	93.8	84.6	91.9	93.8
No. lambs born	No.	52	46	52	47	50	74
% born of ewes lambing	%	152.9	148.4	173.3	142.4	147.1	164.4
No. lambs raised	No.	45	41	42	39	43	61
% raised of ewes lambing	%	132.4	132.3	140.0	118.2	126.5	135.6
% lamb loss	%	13.5	10.9	19.2	17.0	14.0	17.6
Av. birth wt. of lambs born	lb.	10.4	11.6	9.9	10.7	12.0	11.3
Av. birth wt. - lambs raised	lb.	10.2	11.6	10.4	11.1	12.2	11.7
Av. 120 da. wt. of lambs	lb.	59.6	68.1	70.6	73.2	76.2	82.9
Av. daily gain per lamb	lb.	0.41	0.47	0.47	0.52	0.53	0.59
Total 120 da. wt. of lambs/ewe	lb.	83.9	99.7	96.6	95.2	102.4	117.7
Av. grease wt. of wool/ewe	lb.	10.9	10.0	8.6	8.3	10.2	8.9
Av. fleece grade b/	No.	64.2	62.8	63.5	63.6	62.5	60.4
Av. ewe production index	No.	103.8	108.5	112.3	103.7	114.1	126.0

a/ Seasons denote lambing periods. Most of the fall lambs were born in September, spring lambs in May and winter lambs in January.

b/ Spinning counts.

Table 2. Comparison of seasons a/

Item	Unit	Fall 1964 & 66	Spring 1965 & 67	Winter 1966 & 68	Total 1964-68
No. ewes exposed	No.	78	74	80	232
No. ewes lambing	No.	67	65	75	207
% of exposed ewes lambing	%	85.9	87.8	93.8	89.2
No. lambs born	No.	99	96	126	321
% born of ewes lambing	%	147.8	147.7	168.0	155.1
No. lambs raised	No.	84	84	103	271
% raised of ewes lambing	%	125.4	129.2	137.3	130.9
% lamb loss	%	15.2	12.5	18.2	15.6
Av. birth wt. of lambs born	lb.	10.4	11.8	10.5	10.9
Av. birth wt. of lambs raised	lb.	10.6	11.9	11.2	11.2
Av. 120 da. wt. of lambs	lb.	65.9	72.2	76.3	71.8
Av. daily gain per lamb	lb.	0.46	0.50	0.54	0.50
Total 120 da. wt. of lambs/ewe	lb.	89.3	101.1	109.2	100.3
Av. grease wt. of wool/ewe	lb.	9.6	10.1	8.7	9.5
Av. fleece grade b/	No.	63.9	62.6	61.6	62.7
Av. ewe production index	No.	103.8	111.4	120.4	112.2

a/ Seasons denote lambing periods. Most of the fall lambs were born in September, spring lambs in May and winter lambs in January.

b/ Spinning counts.

Table 3. Four-year production summary - 9 ewes a/

Item	Unit	Fall 1964	Spring 1965	Winter 1966	Fall 1966	Spring 1967	Winter 1968
No. ewes lambing	No.	9	9	9	9	9	9
No. lambs born	No.	11	13	18	13	12	16
% born of ewes lambing	%	122.2	144.4	200.0	144.4	133.3	177.7
No. lambs raised	No.	10	13	14	12	12	15
% raised of ewes lambing	%	111.1	144.4	155.5	133.3	133.3	166.7
% lamb loss	%	9.1	0.0	22.2	7.7	0.0	6.3
Av. birth wt. of lambs born	lb.	11.8	12.3	10.0	11.4	12.5	10.8
Av. birth wt. of lambs raised	lb.	11.4	12.3	11.1	11.4	12.5	12.4
Av. 120 da. wt. of lambs	lb.	57.7	74.6	70.3	79.3	80.4	84.9
Av. daily gain per lamb	lb.	0.39	0.52	0.49	0.57	0.57	0.60
Total 120 da. wt. of lambs/ewe	lb.	72.1	107.8	109.3	105.8	107.2	122.7
Av. grease wt. of wool/ewe	lb.	10.3	9.8	8.6	8.6	10.1	9.2
Av. fleece grade b/	No.	63.8	62.0	63.3	63.3	62.9	62.7
Av. ewe production index	No.	104.1	123.2	116.3	119.5	121.7	132.3

a/ Seasons denote lambing periods. Most of the fall lambs were born in September, spring lambs in May and winter lambs in January.

b/ Spinning counts.

Table 4. Comparison of seasons - 9 ewes a/

Item	Unit	Fall 1964 & 66	Spring 1965 & 67	Winter 1966 & 68	Total 1964-68
No. ewes lambing	No.	18	18	18	54
No. lambs born	No.	24	25	34	83
% born of ewes lambing	%	133.3	138.9	188.9	153.7
No. lambs raised	No.	22	25	27	74
% raised of ewes lambing	%	122.2	138.9	150.0	137.0
% lamb loss	%	8.3	0.0	20.6	10.8
Av. birth wt. of lambs born	lb.	11.6	12.4	10.4	11.3
Av. birth wt. of lambs raised	lb.	11.4	12.4	11.7	11.8
Av. 120 da. wt. of lambs	lb.	69.5	77.4	77.3	75.0
Av. daily gain/lamb	lb.	0.48	0.54	0.55	0.53
Total 120 da. wt. of lambs/ewe	lb.	89.9	107.5	116.0	102.8
Av. grease wt. of wool/ewe	lb.	9.5	10.0	8.9	9.4
Av. fleece grade b/	No.	63.6	62.4	63.0	62.9
Av. ewe production index	No.	111.8	122.4	124.2	119.3

a/ Seasons denote lambing periods. Most of the fall lambs were born in September, spring lambs in May and winter lambs in January.

b/ Spinning counts.