COMPARISONS OF SPRING AND FALL LAMBING PROGRAMS IN KANSAS

by

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INTRODUCTION

The sheep industry produces two products, wool and meat, which differ widely in nature, use, price and ultimate distribution. The quality and quantity of wool and meat both may be greatly influenced over long periods of time by the relative importance of these products as sources of income to sheep producers.

In the early history of the United States sheep were raised almost exclusively for wool. Later, mutton became a more important market commodity for the sheep industry. In more recent years lamb production has become the major source of income for sheepmen. Lamb has gained its prominence in the sheep industry because of the relatively greater demand for lamb as meat in comparison with the demand for wool. However, lamb and mutton do not occupy an important position in the American diet compared with beef and pork.

When wool was the main source of income, relatively large numbers of wethers were kept in the flock and lambs were raised mainly to replace sheep lost by death and the few sold for slaughter. In more recent years, with increases in the relative importance of lambs for slaughter, the emphasis in sheep raising has shifted from mature wethers toward lamb production, and likewise from the maintenance of fine wool breeds toward the production of meat types.

The proportion of wool growers' income received from shorn wool sales decreased from an average of about 42 percent of the total income to the sheep industry in 1910-1919 to an average of about 33 percent during the early 1950's. The return in Kansas, a farm flock state, will average 20 to 23 percent from wool production.

Conversely, income derived from sale of sheep and lambs for slaughter increased from a 1910-1919 average of 58 percent of total income to sheep raisers to an average of 67 percent in the early 1950's. In 1955 the income from the sale of sheep and lambs accounted for about 71 percent of the total income from sheep. The return in Kansas averaged 77 to 80 percent in 1956.

For more than 2000 years sheep have produced an important part of sustenance and clothing of man. Since ancient times sheep and wool have played an active part in the activities of man. Abraham, in the lands of Cannaan, watched over and tended his flocks, and used them for food and clothing for his tribe. Even beds and material to cover Nomads' houses have come from the pelts of sheep. Sheep have long been called the "golden hoof".

The production of high quality spring and fall or early winter lambs has long been an important enterprise on Kansas farms. Lamb production has been encouraged throughout the state with the major emphasis having been placed on fall lambing programs. Kansas produces excellent wool and lambs as a result of its desirable climate, its native and temporary pastures, suitable topography, and good terminal markets for fat lambs and wool.

The main programs of sheep production in Kansas are as follows:

1. Commercial ewe flocks for the production of spring or fall lambs for the market.
2. Feeder lambs fed in the dry lot or on wheat pasture for slaughter.
3. Purebred flocks for the provision of breeding stock for flock improvement.

A market lamb production contest was started in Kansas during 1950 and 1951. The program is conducted under the cooperative sponsorship of the Kansas City, Missouri Chamber of Commerce, Kansas State College, and the Kansas Agricultural Extension Service. Annual awards in the form of plaques

and certificates are given to Kansas flock owners in recognition of outstanding management and production practices in raising and marketing of fat lambs. This recognition emphasizes the maintenance of commercial ewe flocks.

The participation of producers in this program is shown in the following summary:

Table 1. Kansas lamb producer records.

Year	No. of entries	No. ewes	Average flock size	Average return per lamb
1951	8	1945	174	$18.65
1952	15	2204	147	11.03
1953	32	4355	133	6.23
1954	34	3788	108	12.41
1955	39	5571	142	10.20
1956	30	4367	145	10.72

The data which were compiled in production record reports by sheep producers were summarized for the comparison of spring and fall lambing programs. The merits and disadvantages of the two lambing seasons were evaluated on the basis of comparisons which were made possible by these summaries.

REVIEW OF LITERATURE

Reports of research comparing fall and spring lambing programs are very limited. It is generally known that the breeding behavior of sheep is an important factor which introduces many problems relative to fall lambing.

A complete review of the literature of this problem has been made.

Miller (13) reported two important observations. First, the inherent early breeding tendency of the Rambouillet ewe is an important factor in fall lamb production, and second, that consumers do not discriminate sufficiently in regard to weight and quality of lamb carcasses to permit Southdown lambs to compete favorably with the larger and coarser Hampshire or Suffolk lambs as measured by gross income.

California is one of the leading states in production of fall lambs born in December and January and marketed in April and May. Records indicate the establishment of the rail marketing of fall lambs in California as early as 1898.

The changing the breeding season in ewes from October and November to June and July has been gradual and has taken place over a period of years. The extra nutritional requirements of ewes producing fall lambs has been largely overcome through the use of supplemental feeds and fall and winter pastures. The fattening of suckling lambs is a speciality operation. Rambouillet ewes are good wool producers and are also gregarious. Likewise they possess hardiness and longevity. They tend to breed early (June-July) but they are not considered the best milk producers.

Miller (15) stated that, under conditions prevailing in Kentucky, Rambouillet ewes are hardier and breed earlier but are not as prolific as either the black-face crossbred or the Columbia and Corriedale crosses. Rambouillets were most useful in producing very early or out-of-season lambs.

Kammlade, et al,(12), stated that the pituitaries contain more gonadotrophic hormones during the anestrus period than they do during estrus cycles. The total gonadotrophic potency of pituitaries during the non breeding season of sheep is uniformly higher than during the breeding season.

There is a distinct and significant drop in gonadotrophic activity at the time of the first heat period of the breeding season. During the cycle there is a steady rise in potency from the day of heat to the 16th or 17th day of the cycle when the hormone level reaches a maximum during the estrus cycle. The non breeding season appeared to be due to the activity of the anterior lobe of the pituitary.

Sheep have been the subject of intense studies on the physiology of reproduction. Hammond (9) stated that a lamb may be considered sexually mature at about 300 days of age. The minimum age of first heat occurs in the age of about 180 days. In the event that this age is reached late in the breeding season, heat may not occur until the following season at which time the animal may be 400 or more days old. Young ewes of approximately 300 days of age begin their breeding season at the same time as mature ewes. The season starts later in younger ewes. Late lambing ewes may not display heat until the next season.

According to Hammond suckling delays the start of the breeding season and the incidence of twinning is less frequent in young ewes than in mature ewes. The occurrence of twinning increases quickly during the breeding season and reaches a peak in November and then declines for the remainder of the breeding season. He also reported that some ewes became pregnant as the result of breeding services well outside of the normal limits of the breeding season.

Hammond stated that the rate of growth in lambs is most rapid during the first two months of age and the heaviest lambs at 6 months of age are usually those born the earliest.

Yeates (17) reported that at the beginning of the present century it was believed that sheep in the British Isles were sexually active during

only a portion of the year. From his studies on photoperiodicity, Yeates (17) concluded that seasonal changes in length of day regulate the time of year at which grade Suffolk ewes exhibit their breeding season under natural conditions in Cambridge, England. It is probable that this applies generally to sheep in all regions of the world; however, it must be remembered that Yeates' studies were conducted in the Northern hemisphere.

Yeates demonstrated that the natural sexual season (which embraces the autumn and winter months) could be modified and even reversed at will by suitable artificial alterations of the daily light ration. In grade Suffolk ewes, the onset of the sexual season is a response to decreasing daily amounts of light and occurs 13 to 16 weeks after the changes from increasing to decreasing length of day. In the same sheep, the cessation of the sexual season is a response to increasing daily amounts of light and occurs 14 to 19 weeks after the change from decreasing to increasing the length of day. These responses occur irrespective of the level at which the changes in trend of daily lighting occurs, and are also unrelated to specific threshold amounts of light.

Some general aspects of the breeding behavior in sheep as described by Yeates (17) are summarized in the paragraphs which follow.

Sheep show a general gradation in length of breeding season, in accordance to the latitude of their place of origin. Sheep in high latitudes have a shorter and more marked sexual season than those originating nearer to the tropics. This variation was probably established by natural selection.

Under natural conditions the ability of ewes of a particular breed to produce two crops of lambs a year depends on the duration of the sexual season and the length of the lactation anestrum. Lactation anestrum apparently varies in length between breeds, but for ewes within a breed, its duration depends largely upon the time of year of parturition. Should lambing occur

at the height of the breeding season, the lactation anestrum may be almost non-existent.

Seasonal variation in fertility of rams also appears to be controlled or affected by the light environment, and the summer decline in libido and semen quality which occurs under natural conditions may be replaced by a period of high fertility following an artificial reversal of the seasonal light condition.

The anterior pituitary is recognized as the organ activated by the light stimulus. Light impulses are received by the eye, from which they are probably passed to the hypothalamus along neural pathways, final transmission to the pituitary being possible by humoral means, via the hypophysial portal vessels.

Hart (10) concluded that a gradually decreasing plane of light and increasing plane of darkness is not an essential factor for stimulating the onset of estrus in sheep, and demonstrated that a standard and regularly maintained rhythm of short light and long dark will stimulate the onset of estrus. The terms short and long are used here in a relative sense, since their significance is solely a means of providing the necessary contrast impulse to the pituitary gland. A ratio of one part of light to two parts or more of dark is sufficient to provide the stimulus. Estrus cycles induced in ewes by artificial light rhythms appeared to be normal in all respects, conforming to the normal interval between heat periods and associated with the ovulation of normal ova. The milk yield of lactating ewes did not appear to be unduly depressed by the onset of estrus periods induced by an artificial light-dark rhythm.

It is known that sheep are seasonally polyestrus and usually start their estrual cycles in the late summer or autumn months. The onset of reproductive activity is believed to be engendered by a light-sensitive retino-pituitary

mechanism Yeates (17). Although the evidence indicates that light is a factor in regulating the seasonal incidence of estrus, the possibility exists that other environmental factors may also share some responsibility in the regulation or expression of estrus.

Dutt and Bush (5) stated that environmental temperature, which is closely associated with light changes in natural conditions, suggests itself as a factor of possible importance in this respect.

Estrual cycles (14 to 19 days) for ewes maintained under refrigerated conditions appeared to be normal and rams maintained under similar conditions ejaculated normal volumes of semen, Dutt and Bush (5). Their data showed that the breeding season began early in the ewes which were kept under cooler environmental temperature during the summer season. The ewes responded to the cooler environment within 46 days after it was initially provided.

They also observed that lowering the environmental temperature during the hot summer months is effective in preventing sterility in rams. The differences in motility and the percentage of abnormal cells in semen from the control rams and the rams under artificial cooling conditions indicate that morphological changes associated with high summer temperatures can be prevented or greatly modified by keeping rams in a cooler environment. A comparison of the breeding records of the two groups of rams verified these observations.

Whether the lowering of the environmental temperature affected pituitary activity or some other mechanism could not be determined.

If seasonal daily light exposure is responsible for triggering the physiological process or mechanism responsible for breeding activity in sheep, environmental temperature may also have some effect on the expression

of this phenomenon. High environmental temperature may suppress sexual activity by altering general metabolism or by some other means while low environmental temperatures augment or hasten the stimulus.

It is possible to explain the difference in fertility between the control rams and those kept under artificial cooling as being due to the detrimental effects of direct application of high temperature on spermatogenesis and not to any involvement of the endocrine system in rams. However, this explanation will not serve to account for the early onset of the breeding season in the ewes.

Hulet, et al, (11) observed that Hampshire and Shropshire ewes were least fertile on about August 1. Fertility tended to increase after that date until a peak was reached in September. This conclusion was made on the basis of a six year study. Many producers have found it difficult to breed their ewes during the summer breeding season. This problem is economically important and a knowledge of the factors affecting summer fertility is of utmost importance. There is evidence that breeding behavior in sheep is influenced by heredity. Hulet, et al, (11) also reported that the flock incidence of embryonic death was greater during the first 18 days following conception than during the remainder of the gestation period.

The lowered fertility of the rams early in the season is presumably due in part to higher environmental temperatures which usually occur during the early part of the breeding season. The deleterious effect of high temperature on spermatogenesis and fertility has been demonstrated.

Doane (3) studied semen quality in four mutton breeds of rams during the summer months in Kansas. On the basis of semen scores, the breeds were ranked from highest to lowest as follows: Suffolk, Hampshire, Southdown and

Shropshire. Doane also observed that Suffolk and Hampshire rams were more active and reliable breeders during the summer months.

It is important that ewes conceive as a result of breeding services during the first or second heat period of the summer breeding season if the lambs are to be dropped in time to reach the early market. An early and uniform lamb crop depends upon early breeding and on fewer repeat breedings by the ewes.

Dutt (4), studied the breeding behavior of 180 Northwestern black-faced, crossbred ewes for three breeding seasons. The ewes were paired as they came in heat and inseminated with 0.2 mil of a split portion of fresh undiluted semen from purebred Southdown rams. One ewe from each pair was slaughtered three days after breeding to determine the ovulation rate, the fertilization rate, condition of the ova and the presence of any structural abnormality which would prevent fertilization. The remaining ewes made up the control group and were checked for return to heat and allowed to go to lambing time. Using the ovulation and fertilization rates from the slaughter group as estimates on the control group, the lambs born represented 41.7 percent of the ova recovered, and the embryonic death rate was found to be 32.7 percent. The reproductive performance of the ewes as a group was classified as follows: (1) ova not fertilized 38.9 percent; (2) death of embryo 20.0 percent; and (3) lambed, 44.1 percent. Failure of the ova to become fertilized was the most important factor in accounting for the low lambing rate as a result of summer breeding.

Quality of semen produced by rams of some breeds of sheep has been found to be markedly lower during the summer months than during other seasons of the year. The failure of fertilization and early embryonic death were the principal causes of a low rate of conception of the ewes. Failure of the ewes to ovulate was not an important factor.

Dutt and Bush,(5) reported that semen quality was significantly improved and that fewer services were required to settle ewes by maintaining ewes and rams at lower environmental temperatures during the summer months. Two groups of 20 crossbred (Hampshire x Rambouillet) Western ewes and three Southdown rams were used to study the effect of low environmental temperatures during the summer season on the time of onset of the breeding season and level of fertility. One group was placed in an air-conditioned room with natural light conditions and the temperature was maintained between 45° to 48°F. starting on May 26. The other group was placed in a control room of similar size. Both groups remained in these respective rooms until October 8. The groups were fed identical rations.

The average date of the first estrus was nearly eight weeks earlier for the treated ewes than for the control ewes (July 10 vs. September 2). The regular recurrence of estrus in the ewes which came in estrus early but failed to conceive indicated that normal sexual activity had been initiated in ewes maintained in the air-conditioned room. Fertility of the ewes in which estrus was initiated early was apparently normal. Treated ewes bred to treated rams required 1.9 services per conception, compared to 2.0 services per conception required to settle control ewes.

The semen quality for rams in an air-conditioned (45° to 48°F.) room was considerably better than that for the control rams. In this test all of the ewes ovulated. The ewes mated with the rams kept in the air-conditioned room conceived more consistently. The treated rams produced no larger volumes of semen, but their semen had higher sperm motility, fewer abnormal sperm, and higher sperm concentration. Also the treated rams had consistently lower average rectal temperatures and pulse rates than the controls.

Dutt and Simpson,(6) continued their studies on environmental temperatures on ewes and rams. These later results also suggest the possibility of improving summer conception rates by maintaining rams at lower environmental temperatures during the summer months. In these experiments 120 yearling black-face crossbred Western ewes were used in studies of fertility and embryonic death loss. The breeding period was from August 22 until September 25. The ewes were paired as they came into estrus, and alternate pairs were selected at random to be bred artificially with semen from either a control or a treated ram. Each ram used furnished semen to breed 20 ewes. Ten ewes of each group were slaughtered for fertility observations and ten were maintained for lambing data. The slaughter groups of ewes provided information on the fertilization rate and the control groups, information on the lambing rate and embryonic death loss. Embryonic death loss was considered to be the difference between the fertilization and the lambing rates.

The quality of the semen from the rams in the air-conditioned room was considerably higher than that of the control rams. There was no significant difference in the volumes of semen produced by purebred Southdown rams kept in the air-conditioned room at 45° to 48°F. during the summer months compared to the volumes produced by rams maintained under natural environmental conditions. From August 20 to September 24 the average percents of motility for weekly collections of semen were 70.3 for treated rams (air-conditioned room) and 41.8 for control rams. For the same period, semen from treated rams contained 6.4 percent morphologically abnormal sperm and that from control rams, 36.9 percent. The sperm concentration for the semen from the treated rams was significantly higher than that for the semen from the control rams. The average rectal temperature and pulse rate of the treated rams were significantly lower than those of the control rams. The ewes bred to the treated

rams showed significantly higher conception rates than those bred to control rams.

Dutt and Hamm,(7) exposed rams to high environmental temperatures during the winter by artificial methods and the semen quality was impaired in unshorn rams. The quality of the semen from the hot-room shorn rams did not differ significantly from the control rams.

In these tests four Southdown rams were kept in a heated room at 90°F. for one week in January. Two of the rams were shorn before they were placed in the room and two were left unshorn. The two rams kept in the unheated barn served as controls. Rectal temperatures, pulse rates and respiration rates were taken regularly in the three groups. Rectal temperatures of the hot-room unshorn rams were highly significantly greater than those of the control rams. Semen samples were collected twice a week. Semen from the three groups of rams did not differ significantly during the pre-test collections, nor at the end of the one-week test period. However, five weeks after the test period terminated, the average sperm motility for the three groups were as follows: 85 percent for the controls; 80 percent for the hot-room shorn rams; and less than 10 percent for the hot-room unshorn rams. Percentages of morphologically abnormal cells were 10.0, 8.1 and 71.0, respectively. Sperm cell concentration was lowest for the hot-room unshorn rams. Spermatogenesis in the hot-room unshorn rams was apparently impaired by the treatment, whereas very little effect was found in the shorn rams.

Bell, et al, (1) compared three different breed types of Western ewes for commercial lamb production in Kansas over a five year period. The Rambouillet fine wool ewes bred and lambed earlier than Northwest black-face or Northwest white-face ewes. Because of the earlier lambing dates, lambs

from the Rambouillet ewes usually reached market weights prior to those from the other two types of ewes. Prolificacy was not significantly different between the three breeds.

Lambs from black-face or white-face ewes usually gained slightly faster than lambs from finewool ewes. The white-face crossbred ewes generally produced the heaviest fleeces, followed in order by the Rambouillet ewes and the black-face crossbred ewes.

Gardner (8) observed that under proper management practices, and given the opportunity, some ewes come in heat, breed and conceive during any month of the year, with the possible exception of a period extending from approximately the middle of January to the last of March. He also noted that some ewes came in heat, bred and conceived during a lactation period.

The percentage of lamb crop is an important factor contributing to the financial success of the sheep producer. Miller, et al, (14) found that fertility in sheep was affected by the level of nutrition. As the result of a seven year study they concluded that the level of nutrition during breeding and gestation periods effecting the financial stability of sheep production enterprises. Rations deficient in vitamin A, protein, phosphorus or having an inadequate energy content resulted in the loss of lambs.

Pickrell and Stanley, (16) made a three year study of twenty Arizona sheep ranches with reference to production systems and sizes of units. The study included the years 1927, 1928, and 1929, and market prices referred to were for that period. The lambing percentage was 93 percent for November lambing, 88 percent for February, and 78 percent for May. The average value of all lambs sold per head was $9.64. The November lambs averaged $11.52 per head, the February lambs, $8.71 and the May lambs, $8.03. Average receipts for all

operations were $9.26 per head, while the highest receipts were $13.25 for the early lambing operations.

The managerial ability of the operator was believed to be as important as the production system used.

Cox and Bell, (2) estimated that the average feed required to fatten a feeder lamb beginning with an initial weight of 65 pounds to 107 pounds, after removing an average of 6 pounds of wool, included 125 to 150 pounds of grain, 300 pounds dry roughage or its equivalent, 25 pounds of high protein supplement, and 5 pounds of limestone and salt.

PROCEDURE AND METHODS

Actual production records were secured from fourteen lamb producers located in different areas of Kansas. A total of 1695 ewes were included in the records. Six hundred twenty-nine ewes produced 862 spring lambs and 1066 ewes produced 1272 fall lambs in these records. The data were furnished by the producers and represent the actual production costs in each operation.

The lambs born in February, March, April or May were considered spring lambs. Those born in October, November, December or early January were considered fall lambs. The actual lambing period in many operations extended over longer periods of time but average lambing periods were used for the classification of individual programs.

The types of ewes used were Northwest crossbreds, native ewes and Southwest crossbreds, and a high percentage of fine wools (Rambouillet). The breeds of rams used were not designated but all rams were of the purebred mutton breeds.

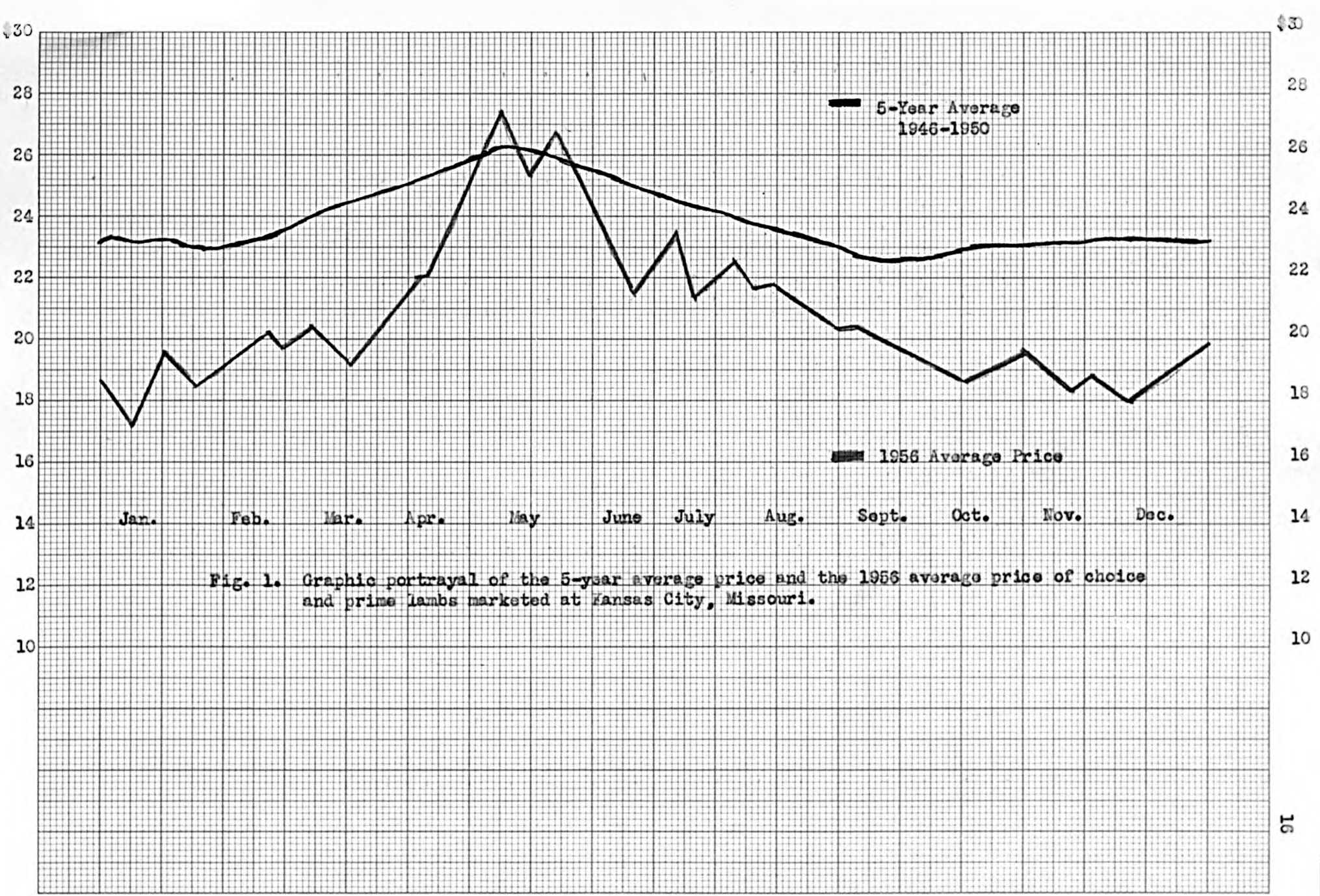

Fig. 1. Graphic portrayal of the 5-year average price and the 1956 average price of choice and prime lambs marketed at Kansas City, Missouri.

The following (Table 2) explains the spring and fall lambing programs used by the cooperators who reported records.

Table 2. Farm flock calendar.

	Early lambing (fall)	Late lambing (spring)
Flush ewes	May 20 to June 15	Oct. 1 to Nov. 1
Turn in rams	June 1 to July 15	Nov. 1 to Dec. 15
Separate rams	July 15 to June 1 - Next year	Dec. 15 to Nov. 1 - Next year
Rest period	July 15 - Nov. 1	Dec. 15 - April 1
Grain for ewes	Oct. 1 to Lamb - Marketing	Jan. 1 to July 1
Lambing season	Nov. 1 to Dec. 15	April 1 to May 15
Grain for lambs	Dec. 1 to Marketing	Oct. 1 to Marketing
Market lambs	April - On	February - On
Wean all lambs	May 15	Sept. 15

The record form used by individual operators for reporting their production records under the supervision of their county agricultural agent is included in the appendix. The production data reported by these operators are summarized in Tables 3 and 4.

Table 3. Summary of spring lambing - fall lambing program records reported in Kansas.

Name	Address	County	Breed	No. of ewes	No. of rams
Kenneth Short R. V. Winzer	Augusta	Butler	Northwest	75	2
Bill Clark	Hutchinson	Reno	Western	67	3
Joanna Gilliland	Olathe	Johnson	Natives	50	2
Paul E. Taylor	Chapman	Dickinson	Northwestern	160	7
Laurence Twaddell	Beloit	Mitchell	Columbia x Rambouillet	90	4
Geo. Scholz	Frankfort	Marshall	Natives	123	6
James Kozisek & Sons	Holyrood	Ellsworth	Western	64	3
Total or Average				629	
Paul Hearting	Halstead	Harvey	Northwestern & Hampshire	110	3
Homer Jacob	Valley Center	Sedgwick	Western & Natives	120	4
Jack McNair	Jetmore	Hodgeman	Texas	300	10
Dale W. Miller	Luray	Osborne	Corriedale x Texas Panama	162	3
Geo. Paul	Minneapolis	Ottawa	Western	183	7
J. Frank Scraper	Beloit	Mitchell	Western	117	6
Francis Brinker	Cawker City	Mitchell	Western	74	2
Total or Average				1066	

Average lambing date	No. lambs dropped	No. lambs saved	% No. lambs raised	Sale weight	Average age at sale	Gain per day	Selling date	Average selling price
Spring Records								
Feb. 24	98	85	113	94	123	.66	July 2, '56	22.00
Mar. 12	109	99	148	84.8	188	.40	Sept. 17, '56 Oct. 5, '56	20.95
Feb. 20	72	71	142	80	130	.55	Sept. 1, '56	18.00
Mar. 10	230	223	139	97	320	.27	Feb. 18, '57	20.00
May 10	94	85	94.4	98.2	300	.297	Mar. 12, '57	22.00
Apr. 15	182	162	130	91.85	280	.30	Feb. 12, '57	20.21
Mar. 16	77	71	111	124	332	.32	Feb. 14	19.00
	862	716	113.8	95.69	241	.399		20.31
Fall Records								
Jan. 1	145	130	118	92	97	.88	Apr. 5	20.84
Nov. 15	160	140	117	95	150	.60	Apr. 13	24.00
Dec. 7	330	300	100	100	159	.58	May 15	24.00
Dec. 20	204	190	117	90.1	130	.64	Mar. 20 May 1	23.50
Dec. 15	210	205	112	99	125	.71	Feb. to May	21.44
Nov. 15	123	122	104	91.4	170	.49	May 1-15	26.38
Nov. 20	95	85	115	91	160	.50	May 2	27.80
	1272	1172	109.9	94.07	141.6	.63		23.99

Total sale value	Winter feed per ewe	Wintering ewe cost	Cost of grass per ewe & lamb	Incidental expense per ewe
20.68	Rye pasture, Brome, Alfalfa Hay 360#, Range Cubes 40#	10.50	4.00	3.61
18.03	Alfalfa Hay 360#	8.10	2.25	2.12
14.40	Milo 180# Alfalfa Hay 270#, Oats 67.5#	7.50	3.10	3.22
19.45	Brome P. Milo 67.5# Milo Pasture, Silage, Alfalfa Hay	10.00	3.05	2.80
21.60	Sorghum Silage 360#, Milo 150# Alfalfa Hay 45# SBM 8#	3.80	2.10	1.72
18.66	Wheat Pasture, Brome Grass Silage 180#, Alfalfa Hay 360#	7.30	2.00	2.54
23.56	Hay, Rye Pasture Milo 72#	6.75	2.29	2.31
19.47		7.71	2.68	2.62
19.17	Alfalfa 90#, Silage 142#, C.S.M. 18# Winter Temporary Pasture	4.36	1.50	3.00
22.80	Winter Temporary Pasture Alfalfa Hay 120#, Oats 30#	5.56	1.50	2.31
24.00	Alfalfa Hay 750# Milo 180#	10.74	3.00	2.93
21.17	Sorghum Pasture, Alfalfa Wheat Pasture	1.86	1.38	1.73
21.22	Alfalfa Hay 300#, Grain 187# Kochi Pasture	6.92	1.03	2.75
24.11	Grain 120# Alfalfa Hay 750#	6.70	.75	1.85
25.30	Ensilage 1500#, Grain 100# Alfalfa Hay 100#	9.25	2.50	1.45
22.54		6.77	1.67	2.29

Total yearly ewe cost	Wool Credit	Net yearly ewe cost	Ewe cost producing one lamb	Feed fed to lamb	Feed cost per lamb	Marketing cost per lamb	Total cost producing lamb	Net return per lamb above costs
18.11	5.20	12.91	11.39	Oats .8#, Alfalfa 7# Barley 90#	.16	.40	11.95	8.73
12.47	6.48	5.99	4.05	Alfalfa Hay 110# Oats 60#, Milo 60#	3.11	.90	8.06	9.97
13.82	6.50	7.32	5.15	Alfalfa Hay 50# Silage 308#	2.95	.30	8.40	6.00
15.85	7.00	8.85	6.63	Milo 215#, Alfalfa 89# Milo 241#, Alfalfa Hay 161#	7.30	.90	14.85	4.62
7.62	6.30	1.22	1.29	Silage 80#, SBM 10#	8.20	1.28	10.77	10.83
11.84	6.55	5.29	3.78	Corn 168#, Brome, Alfalfa Hay 200# Alfalfa Hay (concentrate)	7.25	1.09	12.12	6.44
11.35	3.56	7.79	7.21	Milo 160#, Pasture,	8.73	1.02	16.96	6.60
13.01	5.34	7.05	5.64		5.39	.84	11.87	7.60
8.86	4.26	4.60	3.90	Corn 37#, Molasses 10#, Milo 37# CSM 7.4# Wheat Bran 16#, Alfalfa Pellets 25#	3.38	1.00	8.28	10.89
9.37	7.20	2.17	1.86	Milo and Corn 80#, Alfalfa Hay 30# Rye Pasture, Dehyd. Alfalfa Pellets 10#	3.00	.40	5.26	17.54
16.67	7.15	9.52	9.52	Milo 135#	2.67	1.25	13.44	10.56
4.97	2.81	2.16	1.84	Milo, Alfalfa Alfalfa 60#	3.86	1.29	6.99	14.18
10.70	5.90	4.80	4.21	Milo, Corn, Oats, Barley 105#	3.23	.59	8.03	13.19
11.30	4.50	6.80	6.48	Milo & Oats 100#, Alfalfa 100# Milo, Oats, Barley 100#, Hay 50#	3.00	1.18	10.66	13.46
13.20	6.98	6.22	5.41	Ensilage 250#, Protein Supp.	4.13	1.22	10.76	14.54
10.72	5.54	5.18	4.75		5.82	.99	9.06	13.48

Table 4. Comparison of labor requirements of spring lambing and fall lambing programs in Kansas.

Name	Hours labor required of operator: Total Winter	Total Grazing	Other for Year	Total for Year
Spring Records				
Kenneth Short R. V. Winzer	180	180		360
Bill Clark	90	18	15	123
Joanna Gilliland	135	120	270	525
Paul E. Taylor	180	92½		272½
Laurence Twaddell	150	105	255	510
Geo. Scholz	Labor not reported			
James Kozisek & Sons	225	92½	255	572½
Total labor for 506 ewes				2362
Fall Records				
Paul Hearting	Labor not reported			
Homer Jacob	Labor not reported			
Jack McNair	Labor not reported			
Dale W. Miller	900	180	50	1130
Geo. Paul	540	45		585
J. Frank Scraper	480	37½		517½
Francis Brinker	420	25		445
Total labor for 536 ewes				2677½

506 head ewes - spring records --- 4.66 hours per ewe.

536 head ewes - fall records ----- 4.99 hours per ewe.

ANALYSIS AND OBSERVATIONS

The production of fall or spring lambs is an important livestock enterprise on many Kansas farms. The fall lambing program has been preferred by the majority of lamb producers, but many good producers also use a spring lambing program.

The type of program employed depends largely upon the general management of the farm. Either program has its merits and disadvantages.

Controlling internal parasites in lambs and predatory animals during the summer introduces special problems.

The fall lambing program is adapted to most Kansas farm operations because the lambs can be placed on a desirable market as indicated in Fig. 1. This program utilizes labor at a time of the year when it is not highly competitive with other farm operations and the operator avoids most of the internal parasite problems.

Producers employing the spring lambing program believe that it requires less labor in the lambing season because of more uniform lambing dates, less grain for the ewes and lambs, and that it utilizes pasture and roughages more efficiently than fall lambing programs.

The problem of breeding ewes during the summer months has been discussed.

This study permitted the following comparisons and statements regarding the two lambing programs in Kansas: (Tables 3 and 4)

Fall Lambing

1. The percentage lamb crop raised was 109.9 percent in fall lambing programs.

2. Fall lambs were marketed at younger ages and at approximately the same weight as spring lambs.

3. Fall lambs made more rapid average daily gains.

4. The average marketing date of fall lambs varied from April 5 to May 15.

5. The fall lambs sold for a higher average price per lamb.

6. The total sale value of fall lambs was $3.07 per lamb over that of spring lambs.

7. The wintering cost per ewe was slightly less for those lambing in the fall.

8. The cost of grass was less in the fall lambing program because only the ewes were on pasture during the summer grazing season.

9. The total annual feed cost per ewe was less for the ewes on the fall lambing program.

10. The wool sales per ewe were approximately the same in both programs.

11. The feed cost per lamb was slightly higher for the fall lambs.

12. No differences in marketing cost per lamb existed between the two programs.

13. Fall lambs were produced, on the average, for $2.81 less per head than were spring lambs.

14. The average net return per lamb for the fall lambs was $13.48 compared to $7.60 for the spring lambs.

15. The average net return per ewe for fall lambs was $14.82 compared to $8.65 for the spring lambs.

Spring Lambing

1. Ewes lambing in the spring produced a higher percentage of twins

and a higher percentage of lamb crop at market age, approximately 114%.

2. The spring lambs were older when marketed; however, the average market weights were about the same in both programs.

3. Spring lambs made lower average daily gains than fall lambs.

4. The average marketing date for spring lambs varied from July to the following March.

5. Spring lambs sold for an average of $3.68 less per hundred pounds of live weight than fall lambs which was probably due to the season of the year when they were marketed.

6. Spring lambs required more grain per lamb prior to market on farms where there was a shortage of fall and winter pasture.

7. The total sale value of spring lambs was $3.07 per lamb less than fall lambs of similar average weights.

8. The wintering costs of the ewes were very similar in both programs although as to total amounts of feed slightly lower in fall lambing program.

9. The summer pasture requirement per ewe was higher for the spring lambing programs since pasture was required for both the lambs and the ewes.

10. The total annual ewe cost was higher for the ewes producing lambs in the spring.

11. The wool return per ewe was about the same for both programs.

12. The feed cost per lamb was less for the spring lambs than for fall lambs.

13. The average total costs of producing spring lambs was $2.81 per lamb higher than for fall lambs.

14. The average net return per lamb for spring lambs was $7.60.

15. The market normally is highest in April and May and, therefore, favors the lambs born in the fall (Fig. 1.).

SUMMARY

1. Spring or fall lambing programs are adapted to most Kansas farms.

2. Spring lambing favors a higher percentage of market lambs because of a higher incidence of twinning.

3. The lamb market price is usually higher in April, May and early June and therefore, favors the production of fall lambs.

4. Internal parasite control is not a serious problem in fall lambs while spring lambs on summer pasture must be treated regularly.

5. Fall lambs are marketed before the hot summer months.

6. Fall lambs are usually marketed at younger ages as they gain rapidly during the suckling period.

7. The spring lambing program utilizes more pasture.

8. Late spring lambs may be sold as feeders or put into a feed lot.

9. Some operators have claimed lower wintering costs for ewe flocks on a spring lambing program, however, this study did not substantiate this opinion. The fall lambing flocks had the lower costs; however, this might have been due to dry winter seasons when hand feeding was necessary and roughage prices were high.

10. The spring lambs required more grain per lamb than did the fall lambs and they gained more slowly.

11. Spring lambs may possibly be raised with less labor because they are on pasture most of the summer and fall. This study did not indicate this to be true, perhaps because of a shortage of pasture due to drought conditions. (Table 4.)

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APPENDIX

LIVESTOCK ENTERPRISE RECORD

Name..... Address..... County..... Year..... Farm No.....

BREEDING EWE FLOCK RECORD—FALL OR SPRING LAMB PRODUCTION

GENERAL INFORMATION

Line No.		
1	Breed	
2	Total Ewes in flock at beginning	
3	Number rams used	
4	Are rams purebred	
5	Lambing date of first lamb	
6	Lambing date of last lamb	
7	Average lambing date	
8	No. lambs dropped_____ (8b) No. lambs saved	
9	Percent lamb crop (L8b ÷ L2 × 100)	%
10	Weight at sale	Lbs
11	Weight at birth (estimated average)	Lbs
12	Total gain (L10 minus L11)	Lbs
13	Average age at sale	Days
14	Gain per day (L12 ÷ L13)	Lbs
15	SALES RETURNS	
16	Selling date	
17	Market grade of lambs, if available	
18	Dressing percent of lambs, if available	
19	Carcass grade of lambs, if available	
20	Ave. selling price per 100 lbs.	$
21	TOTAL SALE VALUE (L10 × L20)	$
22	RETURN per LAMB Above Costs (L21 minus L71)	$
23	LABOR	
24	Daily Labor—ave. hours per day (wintering)	Hrs
25	Total Labor—wintering period (L37 × L24)	Hrs
26	Daily Labor—ave. hours per day (grazing)	Hrs
27	Total Labor—grazing period (L46 × L26)	Hrs
28	Any other labor not included above (total Hrs)	Hrs
29	EQUIPMENT AND BUILDING	
30	Original cost of livestock equipment (feed bunks,	
31	self feeders used)	$
32	Original cost of buildings and improvements	
33	(sheds, silos, other permanent improvements	
34	used)	$
35	Portion of buildings used for this (All, half,	
36	third, etc.)	

FINANCIAL SUMMARY

Line No.								
37	WINTERING EWE: From To = Days							
38	Feed	Kind	Daily Ration in pounds	Total Feed fed per ewe	Cost per Unit	Total Cost per ewe		
39								
40	Roughage				$	$		
41								
42	Temp. pasture		XXXX	Acres				
43	Concentrate							
44								
45	TOTAL WINTER FEED COST PER EWE					XXXX	XX	$
46	GRAZING PERIOD: From To = Days							
47	Kind of grass No. ewes and lambs per acre							
48	COST OF GRASS PER EWE AND LAMB							$
49	INCIDENTAL EXPENSE PER EWE:							
50	Interest (average ewe cost $ @ 6%)					$		
51	Taxes							
52	Ram service cost (⅓ original cost of rams ÷ L2)							
53	Misc. costs: Drench, shearing, drugs, etc. Death loss, (Total value ewes lost ÷ L2)							
54	TOTAL INCIDENTAL EXPENSES					XXXX	XX	$
55	TOTAL YEARLY EWE COST (Add L45, 48, and 54)							$
56	Less credit for average fleece value							$
57	NET YEARLY EWE COST (L55 minus L56)							$
58	TOTAL EWE FLOCK COST (L57 × L2)							$
59	EWE COST OF PRODUCING ONE LAMB (L58 ÷ L8b)							
60	LAMB FEED							
61	Feed	Kind	Total Feed per Lamb	Cost per Unit	Total Cost per Lamb			
62								
63	Grain:			$	$			
64								
65	Pasture							
66	Hay							
67	Concentrates							
68								
69	TOTAL FEED COST PER LAMB					XXXX	XX	$
70	MARKETING COSTS PER LAMB (Freight, yardage, commission, etc.)							$
71	TOTAL COST OF PRODUCING LAMB (Add L59, 69, 70)							$

COMPARISONS OF SPRING AND FALL LAMBING PROGRAMS IN KANSAS

by

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B. S., Kansas State College
of Agriculture and Applied Science, 1928

AN ABSTRACT OF A THESIS

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The production of fall and spring lambs is an important enterprise on many Kansas farms. Kansas is considered a farm flock state with the available potentials for greatly expanding farm ewe flock production. An operator must study his farming operations, labor supply and equipment plus the merits and disadvantages of fall or spring lambing programs and select the one most applicable to his farm.

Actual production records were obtained from fourteen producers from different areas of the state. A total of 1695 ewes were included in these records. Six hundred twenty-nine of the ewes produced 862 spring lambs and 1066 ewes produced 1272 fall lambs. The spring lambs were born from February through May, while the fall lambs were born from October into early January.

The producer must be acquainted with those factors which influence successful sheep breeding. The main factors affecting summer breeding are inheritance, nutrition and environmental temperature and light. A program of spring or fall lambing can be adapted to most Kansas farms if the operator has an interest in sheep.

Spring lambing ewes average higher percentages of lamb crop; however, internal parasite control is more difficult. Spring lambing ewes utilize more summer and fall pasture, more grain per lamb produced and less labor during the fall.

Fall lambs generally return a larger profit because they are sold on the high seasonal market (May and June), have fewer internal parasites, avoid the hot season, make more efficient and rapid daily gains, and are generally sold at younger ages at about the same weight as spring lambs.

The study did not show a marked advantage in labor saving for either program but the two programs differ in regard to seasonal labor distribution.

It is commonly believed that the requirement of grain for fattening spring lambs is lower than for fall lambs although the two programs did not differ in this study.

The fall lamb producers made a greater net return per ewe than did the spring lamb producers.