

PROGRESS REPORT: A COMPARISON OF MARKET LAMBS Sired BY SUFFOLK RAMS OF UNITED KINGDOM OR U.S. ORIGIN

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Summary

A preliminary report on a trial in progress is presented. A flock of East Friesian crossbred dairy ewes was inseminated with semen from Suffolk rams of U.K. and U.S. origin in 1998. The U.K. sires were high genetic merit rams from the U.K. Suffolk Sire Reference Scheme, and the U.S. sires were rams of high genetic merit from the National Sheep Improvement Program (NSIP). The inseminated ewes were naturally mated to non-NSIP U.S. Suffolk rams at the estrus following their insemination. Lambs from the three different types of sires were compared for growth and carcass traits in 1999.

A desirable set of Suffolk-sired market lambs was produced. Lambs had an average 120 day weight of 104 pounds and produced carcasses that averaged yield grade 3. There were no significant differences among sire groups for body weights at any age. However, there may have been a tendency for poorer growth from U.S. non-NSIP-sired lambs, for greater early growth in U.K.-sired lambs, and for greater later growth in U.S. NSIP-sired lambs. U.K.-sired lambs had superior leg shape and quality grades when compared to U.S.-sired lambs.

Final conclusions from this year's study can not be made until after the addition of more late growth and carcass data from the third slaughter group of lambs and a comprehensive analysis of the data. There is a good possibility that the trial will be repeated in 1999/2000 with most of the same sires. Two years of data should allow more definitive conclusions to be made.

Introduction

The Suffolk breed originated in southeastern England in the counties of Norfolk, Suffolk, Essex, and Kent from the crossing of improved Southdown rams on the Old Norfolk sheep native to the area. The Suffolk was recognized as a breed by the Royal Agricultural Society of England in 1859. Suffolk sheep were first imported into the United States in 1888, later than the other English meat breeds. It was slow to gain acceptance among U.S. sheep producers; probably because other meat breeds were already well established. The breed started to gain widespread acceptance from 1935 to 1945. During the 1960's, Suffolk rams became the most popular terminal sire breed for the production of market lambs, and they continue in this role today. The Suffolk breed annually registers more purebred individuals than any other sheep breed in the U.S.

Over the past 30 years in the U.S., there has been a large amount of selection emphasis placed on large mature size and tall stature in the Suffolk breed. This has resulted in very rapid

lamb growth rates and an increase in the weights at which U.S. lambs are slaughtered. However, the U.S. Suffolk of today does not exhibit the muscularity in the legs and shoulders of its ancestors. An exception to this trend has been the development of “wether type” lines of Suffolk sheep in recent years to cater to the market lamb show industry that are well-muscled.

The Suffolk breed in the United Kingdom has not had the same selection emphasis on large stature as has the U.S. Suffolk, probably because the English and European markets don't desire a heavy-weight market lamb. Instead, major selection emphasis has been placed on muscle conformation. Whereas many U.K. Suffolk sheep will have mature weights similar to U.S. Suffolks, they tend to be wider, shorter, larger-boned, and more muscular-appearing than U.S. Suffolks.

Both the U.S. and U.K. sheep industries have national genetic improvement programs. The National Sheep Improvement Program (NSIP) in the U.S. was established in 1986. It gives estimates of genetic value called Expected Progeny Difference (EPD) for a number of reproduction, wool, and growth traits. Initially the estimates of genetic value for individuals were only comparable among individuals within a flock, but since 1995, the Suffolk breed has calculated and published across-flock EPDs which allow the comparison of individuals both within and between flocks for estimates of genetic value.

Sheepbreeder is the name of the national genetic improvement program for sheep in the U.K. Its estimate of genetic value is Estimated Breeding Value (EBV; $EBV = 2 \times EPD$). Estimates of genetic value are given for reproduction, growth, and carcass traits and are calculated on a within-flock basis. In the late 1980's, a number of U.K. Suffolk breeders organized themselves into the Suffolk Sire Reference Scheme (SSRS). The SSRS requires all members to be enrolled in Sheepbreeder and to artificially inseminate a specified number of their ewes each year to rams chosen by the SSRS (reference sires). These reference sires have a dual role. They create genetic links across flocks which allow EBVs of individual animals to be compared both within and across flocks. Also, since the reference sires are of high genetic value, their use speeds up the rate of genetic improvement. Over 70 U.K. Suffolk breeders are members of the SSRS, and their flocks have made rapid rates of genetic improvement in growth and carcass traits since 1990.

The main objective of this study was to compare the growth and carcass traits of lambs sired by U.K. Suffolk rams from the SSRS and U.S. Suffolk rams from the NSIP. A second objective was to compare the growth and carcass traits of lambs sired by U.S. Suffolk rams enrolled on NSIP and not enrolled on NSIP. **The results in this report are preliminary. Growth and carcass data are still being collected on some of the lambs, and a final statistical analysis of the data has not been conducted.** While mean values of performance reported in this preliminary paper will change somewhat with the addition of more data and after a more complete statistical analysis, the general trends seen here should remain.

Materials and Methods

Semen was made available from three U.K. rams selected by the SSRS and from five U.S. NSIP rams selected by the United Suffolk Sheep Association. The genetic evaluations of the rams which provided the semen are presented in Tables 1 and 2.

Table 1. Genetic evaluations for the U.K. Suffolk rams

Sire	No. progeny	Scrapie genotype	8 wk wt., lb.	21 wk wt., lb.	Muscle depth, in.	Fat depth, in.	Lean index
Expected Progeny Differences							
A	130	171RQ	4.38	7.06	.10	-.012	300
B	101	171RR	3.17	8.04	.10	-.002	289
C	1558	171RR	4.87	9.35	.10	.004	284
Average	596		4.14	8.15	.10	-.003	291

Table 2. Genetic evaluations for the U.S. NSIP Suffolk rams

Expected Progeny Differences					
Sire	% lamb crop	Weaning wt., lb.	Maternal milk., lb.	Milk + growth, lb.	120-day wt., lb.
A	1.7	3.0	.3	1.8	5.5
B	6.4	3.0	.1	1.6	5.7
C	-1.0	2.6	-.4	1.0	4.8
D	9.0	2.1	.9	1.9	3.7
E	1.4	3.1	.5	2.1	5.8
Average	3.5	2.8	.3	1.7	5.1

The SSRS reports EBVs, but I have converted their EBVs to EPDs by dividing by 2 and reported the EPDs in Table 1. The EPDs in Table 1 are relative to lambs born in 1990. For example, the three U.K. rams are expected to sire progeny that weigh 8.15 pounds more at 21 weeks of age (~140 days) than the progeny of a ram of average genetic value born in 1990. The EPDs in Table 2 for the U.S. NSIP rams are relative to the sires and dams of the first animals with NSIP evaluations (founder animals). For example, the four NSIP rams with EPDs are expected to sire progeny that weigh 4.9 pounds more at 120 days of age than the progeny of a founder ram of average genetic value. On average, the U.K. and U.S. NSIP rams are estimated to have above average genetic values for all traits recorded.

In September and October 1998, 175 East Friesian crossbred ewes were synchronized and inseminated by laparoscopy with frozen-thawed semen. Similar numbers of ewes were inseminated with U.K. and U.S. NSIP semen, and one inseminator performed all the inseminations. Conception rates to artificial insemination were 74% for U.K. semen and 43% for U.S. NSIP semen. Ewes were exposed to four non-NSIP Suffolk ram lambs in single-sire mating pens at the estrus following insemination for a “clean-up” mating. The clean-up rams were purchased from breeders in Wisconsin and were typical of Suffolk rams available to commercial producers. Therefore, three groups of lambs were born: from U.K. SSRS rams, from U.S. NSIP rams, and from U.S. non-NSIP rams.

The East Friesian crossbred dams also were involved in another trial comparing two lamb weaning systems. One-half of the lambs were removed from their dams a few hours after birth and raised on milk replacer. The other one-half of the lambs were raised by their dam for 30 days but were separated from their dams overnight. Lambs were weaned from milk replacer or from their dam at approximately 30 days of age.

Males lambs were castrated. Lambs spent their entire life in the barn or a drylot with ad libitum access to a concentrate diet. A ground creep diet and hay was available preweaning. From weaning to approximately 70 days of age, lambs received a 19% crude protein diet of rolled shelled corn and a high protein pellet. From 70 days of age to slaughter, a 12% crude protein diet of whole shelled corn and a high protein pellet was fed. No forage was offered to the lambs during the postweaning growth period. Lambs from all sire groups were mixed in the feeding pens.

Lamb body weights were recorded at birth, at approximately 30, 60, 90, and 120 days of age, and at slaughter. The lambs are slaughtered at a weight endpoint in three groups. The first two groups were slaughtered at an average live weight of 121 pounds, and the third group remains to be slaughtered. Lambs were slaughtered at Wolverine Packing in Detroit, Michigan, and the following carcass measurements were collected: hot carcass weight, leg conformation score (1 - 15), 12th rib fat thickness, lower body wall thickness, loin eye area, and quality grade. Yield grade ($.4 + (10 \times 12\text{th rib fat thickness})$) and dressing percentage ($(\text{hot carcass weight/slaughter weight}) \times 100$) were calculated.

Prior to statistical analyses, live weights taken at approximately 30, 60, 90, and 120 days of age were adjusted for differences in age at weighing using actual average daily gains. Traits presented in this report include birth weight, 60-day weight, 120-day weight, dressing percentage, leg conformation score, loin eye area, 12th rib fat thickness, yield grade, and quality grade. Birth weights of lambs born dead or aborted were deleted from the analysis.

Data were analyzed using the general linear models procedure of the Statistical Analysis System. The model for the body weight traits included the effects of sex of lamb (male, female), birth type of lamb (single, twin, triplet or greater), age of dam (2, 3, 4 years), rearing group of lamb (artificial, on the ewe), sire group (U.K., U.S. NSIP, U.S. non-NSIP), and individual sire nested within sire group. The individual sire nested within sire group mean square was used to test for differences among sire groups. The same model was used for the carcass traits but with the addition of hot carcass weight fitted as a covariate so that carcass traits were adjusted for differences in carcass weight.

Results

Body weights of lambs are presented in Table 3. There were no significant differences between sire groups for lamb body weights at birth, 60 days of age, or 120 days of age. However, there was a tendency for U.S. non-NSIP-sired lambs to have lighter weights at all ages, for U.K.-sired lambs to be superior to U.S. NSIP-sired lambs for early growth, and for U.S. NSIP-sired lambs to be superior to U.K.-sired lambs for later growth. These differences, if found to be significant with the addition of more data, are not surprising given the expected maturity patterns of U.S. and U.K. Suffolk sheep.

Table 3. Body weights of lambs sired by U.S. or U.K. Suffolk rams

Sire source	At birth		At 60 days		At 120 days	
	No.	Weight, lb. ^a	No.	Weight, lb. ^a	No.	Weight, lb. ^a
U.S. ^b						
NSIP	36	12.4 ± .4	36	52.6 ± 2.4	25	106.8 ± 3.5
Non-NSIP	72	12.4 ± .3	70	51.2 ± 1.7	40	101.7 ± 2.8
U.K. - SSRS ^c	101	12.5 ± .2	98	55.4 ± 1.4	74	103.0 ± 1.8

^a Differences between weights within a column are not statistically significant ($P < .05$).

^b NSIP = National Sheep Improvement Program

^c SSRS = Suffolk Sire Reference Scheme

Presented in Table 4 are the carcass traits of the lambs sired by the three sire groups. Unlike the growth traits, there are significant differences among the sire groups for several of the carcass traits. Dressing percentage varied from 52 to 53% among sire groups and was not statistically different. Leg conformation score was significantly greater for U.K. sired lambs (~13) compared to U.S.-sired lambs (~12). The one unit of leg score superiority of the U.K.-sired lambs is an indication of the increased emphasis U.K. breeders have given to meat conformation in their selection programs. However, the increased muscularity of U.K.-sired lambs in the leg was not reflected in significantly larger loin eyes. The lambs sired by the three sire groups had loin eye areas that ranged from approximately 2.5 to 2.6 square inches. Measures of fatness (12th rib fat thickness and yield grade) show an interesting result. Both U.K.-sired and U.S. NSIP-sired lambs had similar amounts of rib fat, and both had significantly more rib fat than U.S. non-NSIP-sired lambs. It is difficult to explain this result. Carcass quality grade which increases with both increased fatness and increased conformation was significantly greater for U.K.-sired lambs (~low prime) compared to U.S.-sired lambs (~high choice).

Table 4. Carcass traits of lambs sired by U.S. or U.K. Suffolk rams

Sire source	No.	Dressing %	Leg score ^a	Loin eye ₂ area, in.	12th rib fat, in.	Yield grade ^b	Quality grade ^c
U.S. ^d							
NSIP	25	53.4 ± .5	11.9 ± .1 ^g	2.46 ± .05	.28 ± .02 ^f	3.2 ± .2 ^f	11.9 ± .1 ^g
Non-NSIP	40	51.9 ± .4	11.8 ± .1 ^g	2.55 ± .04	.24 ± .01 ^g	2.8 ± .1 ^g	11.8 ± .1 ^g
U.K. - SSRS ^e	74	52.2 ± .3	12.9 ± .1 ^f	2.61 ± .03	.30 ± .01 ^f	3.4 ± .1 ^f	12.9 ± .1 ^f

^a Higher values indicate more muscular legs; highest value is 15.

^b Yield grade = .4 + (10 x 12th rib fat thickness).

^c 11 = average choice, 12 = high choice, 13 = low prime.

^d NSIP = National Sheep Improvement Program

^e SSRS = Suffolk Sire Reference Scheme

^{f,g} Means within a column with different superscripts are different ($P < .05$).

Conclusions

A desirable set of Suffolk-sired market lambs was produced in this study. Lambs had 60 day weights of 51 to 55 pounds, 120 day weights of 102 to 107 pounds, and produced carcasses of yield grade 2 to 3. There may have been a tendency for poorer growth from U.S. non-NSIP-sired lambs, for greater early growth in U.K.-sired lambs, and for greater later growth in U.S. NSIP-sired lambs. U.K.-sired lambs had superior leg shape and quality grades than U.S.-sired lambs. Differences in 12th rib fat thickness among sire groups was difficult to explain.

Final conclusions from this year's study can not be made until after the addition of more late growth and carcass data from the third slaughter group of lambs and a comprehensive analysis of the data. There is a good possibility that the trial will be repeated in 1999/2000 with most of the same sires. Two years of data should allow more definitive conclusions to be made.