CANTERBURY CHAMBER OF COMMERCE
AGRICULTURAL BULLETIN
BULLETIN No. 363 OCTOBER, 1959

FAT LAMB SIRES

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The Fat-Lamb Industry:

In all sheep-producing countries there is a close integration between store-sheep production on relatively unimproved hill or grazing country and fat-lamb production on the intensively managed and improved lowland country. The hill country provides the breeding ewes for fat-lamb production. These ewes, such as the Romney, half-bred and Corriedale in New Zealand, are of breeds which are fairly good-woolled, hardy and usually late in maturing. The wether lambs from these ewes do not make high-quality lambs when fattened, and on the fat-lamb farms advantage is taken of cross breeding to produce the best quality lambs. The hill-country ewes are mated to rams of early-maturing breeds which have been specifically bred as high-quality mutton types. This cross breeding not only strongly imprints the carcass of the sire upon the lamb but it also makes the lambs easier to fatten.

In the fat-lamb industry then, there are the specialised fat lambs cross bred by the so-called fat lamb sires, together with the surplus pure-bred Romney, half-bred and Corriedale wether lambs which come down off the hills and are also fattened on the low country. It is, however, with the special cross bred fat lambs that this bulletin is mainly concerned.

The fat-lamb industry in New Zealand began with the half-bred and Romney lambs but was improved towards the end of last century by crossing the ewes with Border Leicester, English Leicester and Shropshire rams. Most of the lambs were rape fattened and taken to carcass weights of about 45lb. Later the Southdown began to take a hold, until by the 1930's about 90 per cent of the fat-lamb sires used were Southdowns, and that position still holds today. With pasture improvement and reduction in area of rape grown, emphasis shifted to lambs fat-off-the-mothers, lambs which were early maturing and which gave a good carcass conformation at this younger age. Market requirements also began to demand a lamb of lighter weight, of the order 28-36lb. and the Southdown sire was ideal in producing a well-finished, blocky carcass at this weight. The almost universal use of the Southdown also gave a high degree of uniformity to the type of lamb exported.

For a few years after the war when there was a shortage of meat there was a swing to heavier carcasses and heavier sires but this has now been reversed to the extent that, of recent years, there has been a premium for the very light weight 20-28lb lamb.

It may be mentioned that in other countries the Southdown is not nearly as popular as it is in New Zealand. In Britain, for example, scarcely any Southdowns are used and the vast majority of fat lambs there are sired by the heavy Down breeds. The position is much the same in the United States. In Australia the Dorset Horn is most popular and although many Southdowns are also used, so to are Suffolks. But conditions in New Zealand are not necessarily to be compared with those in other countries since our lamb is primarily for export and for a particular market.

Experimental Work:

In a country which has been so dependent on the export of lamb it is curious that practically no experimen-

tal work had been done on the influence of the breed of fat-lamb sire until after World War II. Shortly after the war, experiments were conducted by the College at Kirwee and Ashley Dene during the four years 1947-50 and at Ruakura from 1946-49. These trials were conducted before the premium for very light 20-28lb lambs was introduced, and the basis of comparison in the trials was a comparison of the sires against the Southdown when the Southdown-cross lambs were taken to carcass weights typical of the previous 20 years namely 32-36lb. Subsequently trials were recommenced at Ashley Dene and extended over four years, 1953-56. One of the main objectives was the comparison with the Southdown when drafting was done very early and at light weights so that the Southdown-cross lambs killed out in the range 27-30lb.

The method of testing was to take each year a line of 360-450 ewes and divide them evenly so as to give at least 60 ewes per breed-sire. Each group of 60 ewes was mated to two or more rams and each year new sets of rams were used so as to increase the number of representatives of each breed used. From after mating until weaning all the ewes were wintered, lambed and grazed together as one mob. All lambs were ear-tagged at birth, and weighed at regular intervals. Usually one big draft of lambs fat-off-the-mothers was taken and the remainder weaned rather than taking a series of smaller drafts. Each lamb was identified at the freezing works and individual carcass weights, grades and carcass measurements made. Slight corrections due to variations between groups in age and sex ratio could be and were made.

The breed of ewe employed should not greatly affect the comparison of sires and this has been shown to be true. Romneys were used at Ruakura and Kirwee, Corriedales at Kirwee and Ashley Dene, and Border Leicester-Corriedales at Ashley Dene. Further, the results at Ruakura, Kirwee and Ashley Dene have been very similar.

Comparison at Heavy Weights (34-38lb.)

In order to simplify presentation, the results of all the trials at Ruakura, Kirwee and Ashley Dene where age at weaning was of the order 110-130 days and carcass weights of the Southdown-cross lamb was in the range 34-36lb., have been averaged and assembled into Table I as follows:

TABLE I.

Sire	% Primes Drafted FOM*		Carcass Weight		Rape Lambs Carcass Weight	
Purebred (Romney or Corriedale)	32		34.4		35.0	
Southdown	53		34.6		34.8	
Ryeland	53	50–55	35.8	36–37	36.2	36–37
South-Suffolk	54		36.4		36.0	
Border-Southdown	51		36.8		36.8	
Dorset Down	53		37.1		36.9	
Hampshire	55		37.4		37.2	
Border-Leicester	52	50–55	38.3	38–39	39.2	38–39
Dorset Horn	57		37.9		38.5	
Suffolk	46		39.0		38.8	

* Fat-off-mothers

In this analysis (the above figures include all lambs), twins have not been separated from singles. This is because the proportion of twins was not high and also because the differences between sires was of the same order in both twins and singles. To avoid the complication of grading, the percentage drafted includes only those which graded prime. The table does not show that the Southdown was superior to the other sires in getting lambs into the Down-cross grade. (This grade applies to the North Island only).

In brief, the table shows that within experimental error all (except possibly the Suffolk) of the fat-lamb sires give the same percentage of lambs fat-off-the-mothers and that in comparison with the Southdown, the group of "medium" sires Ryeland, South-Suffolk, Border-Southdown, Dorset Down and Hampshire increase carcass weight by about 2lb and the group of "heavy" sires Border-Leicester, Dorset Horn and Suffolk by about 4lb in both the milk lambs and the rape lambs.

Comparison with the pure-bred lambs shows the big advantage gained from crossbreeding in regard to percentage fat-off-the-mothers.

Comparison at Light Weights (28-30lb)

In the series of trials at Ashley Dene from 1953-56 the comparison of sires was made under conditions of early drafting at light weights. Further, in these years there were many more twins sufficient to give reasonably reliable data on twins alone. This is becoming of increasing significance as endeavours are made to increase lambing percentages in New Zealand. The mean ages of the lambs at drafting in the four years was 114, 86, 95 and 101 days respectively.

In the first two years a full range of sires was used, except that the Dorset Horn and Ryeland were not used, but in the last two years the Suffolk and the Dorset Down only were compared with the Southdown using those two breeds as representative of their groups.

TABLE II

Single Lambs Drafted Early

Sire	% Primes F.O.M.		% Seconds F.O.M.	Carcass Weight (Primes only)	
Southdown	65		13	30.9	
South-Suffolk	57		20	33.2	
Border-Southdown	59	60–65	19	33.6	33.5
Dorset Down	66		25	33.6	
Hampshire	62		26	33.7	
Border-Leicester	49		31	35.4	
Suffolk	45	45–50	31	35.3	35.3

TABLE III

Twin Lambs Drafted Early

Sire	% Primes F.O.M.		% Seconds F.O.M.	Carcass Weight (Primes & Seconds)	
Southdown	30		22	28.1	
South-Suffolk	17		18	29.3	
Border-Southdown	20	20	25	29.9	30.0
Dorset Down	21		28	30.0	
Hampshire	20		20	30.8	
Border-Leicester	8	5–10	25	30.8	30.7
Suffolk	5		20	30.6	

These figures show that in respect to percentage of prime single lambs drafted fat-off-the-mothers, the heavy sires are now definitely inferior to the Southdown while some of the medium ones look as though they might be. In the twin lambs the Southdown is clearly superior to all rams. The carcass weight advantage of 4lb and 2lb respectively for the heavy and medium sires is maintained in the single lambs but falls off considerably in the twins.

Carcass conformation:

Measurements of carcass dimensions showed a superiority for the Southdown. Taking the ratio of width of gigots to length of leg as an index of conformation (the higher the ratio the better the conformation) this falls from 0.96 for the Southdown through 0.92 for the medium sires to 0.89 for the heavy ones. This is merely another way of saying that Southdown carcasses are shorter and blockier than those of the medium sires which in turn are better than those of the heavy sires.

Carcass Composition:

The only information available is from the Ruakura trials and these show that the ratio of fat to muscle declines as one progresses from the Southdown to the medium and then to the heavy sires. The optimum muscle/fat ratio is not well defined and it changes with the market. Within a breed, as carcass weight increases, the muscle-fat ratio falls. The optimum weight to give the optimum carcass composition can only be guessed at, but on present-day requirements is probably about 26-30lb for Southdowns increasing to 32-36 for the heavy sires. Clearly many prime lambs offend in being too fat and this is partly the cause of the relatively favourable price for second grade lambs. On the score of overfatness the Southdown is likely to offend most, unless killed at very light weights.

Store Lambs:

The trials mentioned have shown that the differences in carcass weight, grading and conformation apply to lambs fattened after weaning as they do to lambs drafted fat-off-the-mothers. With regard to ease of fattening the data are not very precise but in general show no marked differences. Many farmers contend that lambs by the heavier sires are harder to fatten after a check than are Southdown lambs, but others contend the very opposite. In cases where the pressure is really on, to get rid of lambs irrespective of weight or grading as in drought seasons, one has the feeling that Southdown are easier to quit than are the others.

Classification:

On the basis of the experimental work described it is possible to organise the many sires into groupings or

in an approximate order. These are as follows:

1. *Heavy Sires*

   Suffolk, Border Leicester, Dorset Horn (in order of size or weight). These are the heaviest sires, produce the most rapidly growing lambs, killing out at 4lb heavier carcass weight than the Southdown. If taken to carcass weights of the order of 36-40lb they will draft as many fat-off-the-mothers as the Southdown, but if killed early at light weights they do not grade as well as Southdowns and a lower percentage is drafted. The lambs are inclined to be leggy and not too good in conformation, but they are the leanest or have the highest muscle/fat ratio.

2. *Medium Sires*

   In this group are the Hampshire, Dorset Down, Ryeland and those rams derived from crossing the Southdown and the heavy sires, namely the South Suffolk and Border Leicester-Southdown. This group is intermediate in all respects between the heavy sires and the Southdown, and thus forms a compromise between the two extremes. Within the group the Ryeland is nearest the Southdown, and the Hampshire and Dorset Down, though giving carcass weights slightly above average have a conformation and grading which like the Ryeland more nearly approaches the Southdown.

3. *The Light Sire (Southdown)*

   There is only one ram in this group. It stands on its own as the smallest, slowest growing but earliest maturing of all fat-lamb sires. It reaches a desirable conformation earlier than the others and for this reason is most suited for light-weight lamb production—weights of the order of 24-30lb at which weights it drafts and grades rather better than other lambs. But at weights above about 32lb it becomes too fat.

From this classification it is not difficult to predict where new developments such as the Southdown-Dorset Down might fit in. The purebred sires—Romney and Corriedale, have not been included. They do not possess the advantage of crossbreeding and do not fatten or grade as well as any of the fat-lamb sires.

The relative profitability of the sires has not been quoted since this changes from time to time as the price schedule alters. Even with the present emphasis on light-weight lamb the medium sires can be more profitable in many circumstances than the Southdown but, in general, any differences between sires are less than five per cent and so are not of such significance as to warrant any marked change in policy.

It should be clear from all these results that the ideal ram has not yet been bred. The Southdown would be very near it if only its lambs would grow ten per cent faster and this could be achieved in the course of time if selection for growth rate were given real priority. Alternatively some of the medium sires such as the Dorset Down or South Suffolk may equally attain it by selecting towards a Southdown conformation without sacrificing growth rate. As things stand now, no breed has a monopoly of the advantages and whichever one is used must be a compromise between weight and muscle-fat ratio on the one hand and conformation and grading on the other. At present with the premium for the 20-28lb lamb and a heavy penalty for the over 36lb lamb, and with every indication that over the next fifty years lambing percentages will increase substantially, the odds are in favour of the Southdown and possibly its nearest competitors amongst the medium sires. But if the revolt against fat meat intensifies and if we can develop a substantial lamb trade with North America, a higher proportion of our lambs than at present would have to be by the medium and heavy sires.

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