



## IMPROVING THE SOUTHDOWN BREED

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The studmasters of both hemispheres, have during the past 185 years been continually battling with the problem of breed improvement. Ever since the first major advance was made by John Ellman of Lewes, Sussex and Jonas Webb of Babraham, Cambridge, England, between 1780-1821 by defining the breed as a type of sheep for the production of high quality meat; subsequent Southdown breeders have been facing the continual problem of breed improvement.

Not only is this problem a continual one, in that it always exists, but also what is not always appreciated, is that the further along the road of improvement the breed goes it becomes more and more difficult to effect material improvement.

In theory this is due to the margin for improvement lessening as the optimum is approached. Thus the chances of the breeders of today being able to make advances comparable with those made in the past are very limited. Also, if we continue to use the same methods for selection with their emphasis on the subjective assessment of carcase value, then progress is likely to be of an almost infinitesimal nature, if indeed any will occur at all.

This is because despite all our modern scientific knowledge and ability to think of exploring and colonizing outer-space, we are still not able to improve on the systems of breeding used by the original improvers who, once they had standardized the breed were limited as we are today to inbreeding, line breeding, or outbreeding as mating systems.

Nor is there any reason to suppose that our eye appraisal methods for selecting the animals to fit into these systems see any better than did the eyes of old.

But we today do have advantages, not available in the past, in our planned marketing systems with all the research analysis of what the market requires, constantly being fed to us by various responsible bodies, so that we are left in no doubt as to what is the best type of animal to produce. The fact that it may take anything from three to five years, assuming it is possible, to produce this animal and in the meantime the consumer requirements have altered again never seems to worry the responsible bodies. Thus what at first sight appears to be an advantage, is cancelled out by the failure of the responsible bodies to define objectively the animal required, sufficiently far enough ahead to allow for the sheep generation interval.

In fact many farmer-breeders still, like us, await some official pronouncement as to what is the optimum export lamb weight, further, if such a thing exists to see that its production will give optimum returns to the farmer.

It was therefore with these points in mind that we at Lincoln College embarked on a new objective approach to breeding Southdown sheep in 1958. To-day we are presenting some of the results of the past seven years' breeding. These are being put before you to invite comment and discussion. We do not claim that the methods used are the most suitable, or that they represent some miraculous new system of breeding. To some of you the account will possibly be familiar as you may already have interested yourself in what has been going on at the College. I hope it will bear repeating.

Our first problem near the end of 1957 was to attempt to define objectively, in some form of measurable terms, not requiring the use of eye appraisal, the ideal Southdown. This is not simple. After many attempts

we finally reasoned along these lines. The purpose of the breed was to produce sires which could be mated with virtually any type of ewe and produce an ideal export lamb under New Zealand conditions. Because the present grading system and schedule, fail to differentiate sufficiently in favour of the lamb having the highest quality meat and having it in the right places; emphasis would need to be laid in other directions. Therefore to us it seemed that the next most important factor to consider, was the lamb which reached export weight at the earliest age having consumed a minimum of feed. This description appeared to represent the ideal export lamb which under present New Zealand conditions of the industry would give the best return to the farmer. Translating this into terms of objective measurement, can be done as follows. Let us assume for the moment we want an export lamb of 30lb carcase weight. This then means a lamb of approximately 65lb live weight must be produced "fat" off the mother. This total live weight will be produced through the interaction of two criteria, (a) birthweight and (b) daily growth rate to weaning.

Assuming an average birth weight of 10lb this leaves a total weight of 55lb to be accounted for by lamb growth on the mother. In terms of daily growth rate this means 0.55lb per day if we take a suckling period of 100 days (approximately to 14 weeks), or 0.65lb per day if the lambs are weaned at 84 days (12 weeks).

This gives us an objective target to breed our Southdowns for, namely rams of optimum birth weight, capable of maximum growth rate up to weaning and, what is more important, able to sire export lambs of 10lb birth weight which would grow at the rate of 0.65lb per day at least.

Now the Southdown flock of Lincoln College is number 13 in the Flock Book, the second oldest flock in the country, yet in 1958 after 58 years of stud breeding we had no records to show how heavy our lambs were at birth or how fast they grew from birth to weaning! First this information had to be obtained.

Accordingly in 1958 the total ewe flock was randomized on an age basis into four ram groups and mated to

four rams, two being home breed and two from outside blood. After mating all ewes were boxed and treated as one mob right through until weaning. At lambing all lambs, alive and dead, were weighed and tagged at birth, weighed again at tailing and weighed finally at weaning. All multiple birth weights were corrected to singles and all two-tooth birth weights to mature ewe singles. Similar corrections for growth rate were made for all lambs reared as twins, also two-tooth singles to mature ewe singles.

The 1958 performance of the progeny of the four rams is shown in Table 1 where the mean of each ram's total progeny in terms of birth weight and daily growth rate to weaning is shown. It will be seen that the two rams 187 and X332 were outstanding in birth weight and of these two 187 was superior in growth rate.

This left little doubt as to which sire should be retained. Accordingly Ram 187 (outside blood) was used as the reference ram in the following year 1959. In this year, once again the ewes were randomized into four ram groups and three new rams all outside blood were tested alongside 187 from the previous year. This procedure was adopted so that inter-ram comparisons could be made between years.

The 1959 results showed again that Ram 187's progeny were superior in growth rate to two of the other three and as good as all for birth weight. Armed with this knowledge 187's best son in 1958 was retained for use in 1960. In addition the two best sons of 111 who had performed as well as 187 were retained, and in order to speed up the generation interval used as ram lambs. Thus in 1960 three Lincoln bred rams representing two different blood lines were test mated under the standard mating conditions.

As will be seen from Table 1 the 1960 results once again showed one ram Z129 to be superior to the other two, although each of these nearly matched him in either birth weight or growth rate but not both. Obviously Z129 selected himself for use again in the following year, but which of the other two? On the basis of growth rate we kept A165. In

Table I.

Selection of Stud Rams on Performance

1958	175	187	X173	X332	
B.wt.	7.935	8.907	8.165	8.913	
G.R.	0.472	0.551	0.514	0.494	
		↓			
1959	87	187	111	343	
B.wt.	9.230	9.213	9.234	8.851	
G.R.	0.438	0.456	0.465	0.445	
		↓	↓		
1960	Z129	A165	A330		
B.wt.	9.423	8.989	9.445		
G.R.	0.466	0.460	0.441		
	↓	↓	↓		
1961	Z129	A165	A330	1259	
B.wt.	8.763	8.668	8.387	8.193	
G.R.	0.480	0.481	0.464	0.483	
	↓		↓	↓	
1962	C342		A330	1259	
B.wt.	7.84		7.510	7.19	
G.R.	0.502		0.460	0.461	
	↓			↓	
1963	C342	685	1006	1259	250
B.wt.	7.97	8.28	9.39	7.83	9.03
G.R.	0.495	0.462	0.522	0.462	0.413
	↓	↓	↓	↓	↓
1964	E502	685	E172	1259	E5
B.wt.					
G.R.	0.571	0.522	0.588	0.531	0.498

(All rams with prefix letter are Lincoln bred, rest outside bred.)

addition another sample of outside blood was to be brought in. However when the final selection of the ewes for test mating was being made it was thought desirable to use again all three Lincoln rams in 1961 together with one new outside blood line.

The 1961 results could be described as something akin to a mixed grill

with Z129 still able to show his slight superiority over A165 and A330. The new outside blood line 1259 scored well in growth rate but rather failed on birth weight, however it was decided to use him again because of the good growth rate score and to continue the Z129 line by using his best son C342 as a ram lamb.

The results from the 1962 matings will be seen to be fairly clear cut with C342 definitely superior and 1259 not able to quite measure up again on birth weight.

In 1963 five rams were mated, three new sources of outside blood being tested against C342 and 1259 and once again 1259 slipped on birth

weight so this line had to be considered for discard as a sire source particularly as two of the new lines showed promise.

The line-up for 1964 consisted substantially of the same blood lines as in the previous year, except that in three cases the best son of the sire was used as a ram lamb.

TABLE 2  
**Performance of Stud Rams Mated to Romney Ewes**  
1964 Lambing

Ram	Lincoln E502	1259	685
Birth Weight (lbs)	10.55	9.57	10.15
Daily Growth Rate (lb)	0.658	0.611	0.614

The results obtained from the 1964 matings look very encouraging with one of the new outside blood lines 1006 showing considerable promise but still closely followed by the ever consistent 187 line representative E502. A new technique for evaluation was introduced in 1964 when in addition to their quota of stud South-down ewes, three of the rams were test mated, each with a balanced sample of Romney stud ewes which had been culled for age. It was felt that the lambs produced by each sire in this way would give as near as possible an estimate of their commercial export lamb producing qualities. Needless to say once mated all the ewes and lambs were treated as one mob until slaughter. The preliminary results are shown in Table 2 and tend to follow the same pat-

tern as in the case of the pure South-down matings. Not only do these results tend to confirm the methods used but they also provide a practical proof of the theoretical commercial advantages of this method of selection as a means of breed improvement. Referring once again to Table 2 where, if we compare the performance of 1259 and E502, we see that in birth weight E502's progeny are one pound heavier than 1259's and in growth rate they are superior by 0.047 pound per day. If we take a theoretical sample of 100 lambs sired by each ram grown over 100 days then the progeny of E502 would have 470 pounds of extra meat, roughly equivalent to seven extra lambs on the property! In actual fact when these lambs were weaned, the figures were as follow:

Ram	Lamb Mean Weaning Age in Days	Lamb Mean Weaning Weight in Pounds
E502	105.2	68.8
1259	106.5	60.0

There should be no need for me to underline what this difference represents in terms of additional cash return to the farmer, or in making just that difference between a mob ready for drafting and a mob still requiring to be finished before this can take place. If these figures are multi-

plied up onto a farm scale of say 1000 lambs they look more impressive, there would be 8,800 pounds of additional meat equivalent to 135 extra lambs for sale on the property, at no extra cost, all through using rams similar to E502 instead of 1259.

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