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Face Cover in Romney Sheep

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PREVIOUS reports by Barton (1954) and Rae (1955) have indicated that the close-faced ewes in a flock of Romney sheep give a lower lambing percentage than do the more open-faced ewes. This present paper sets out the results on which these preliminary observations were based and gives details of work now in progress. The current work is aimed at attempting to elucidate why face cover has an effect on productivity as well as at determining the optimum amount of face cover in order to achieve maximum production in terms of both wool and lambs. Reports on the effects of face cover in other breeds of sheep have been recently reviewed by Rae (1956).

Two flocks in particular will be discussed, both of which have been run on the Massey Agricultural College farm under good low-land conditions. The first of these is the Romney Sheep Breeding flock. The essential point of this flock is that a system of random mating is used and no selection for any character takes place. The second flock, called the Face Cover flock, is being used for more detailed studies of face cover and its relationships with the fleece and with fertility. This flock was started in 1955 with 90 two-tooth ewes which were selected from about 550 two-tooth ewes in order to obtain the 30 most open-faced and the 60 most woolly-faced. Of these 60 woolly-faced sheep, 30 are being kept clear of wool by wiggging and 30 are left unwiggled except at shearing time.

GRADING SYSTEMS.

(a) The Original Face Cover Grade.

In the first year, 1953, the ewes were graded as woolly, intermediate and open-faced, the last category being those which did not require eye-wiggging. In 1954 and 1955, these grades were further subdivided. Grade 1 was used to describe sheep which were wool blind while sheep which were woolly-faced but with a clear ring of skin around the eyes were graded as 1 R. Grade 2 represented sheep which were woolly-faced but not actually blind and Grades 3, 4 and 5 denoted increasing degrees of freedom from wool on the face.

The gradings were made on all ewes in June of each year before they were crutched and eye-wiggged. The correlation between successive grades on the same animal is high (0.75) but face cover shows a slight decrease as the animal becomes older.

(b) The Face Grade and Eye Grade.

When detailed work commenced last year, the face cover grading described above was found to have the disadvantage of being affected by the amount of wool grown by the sheep. It therefore varies with the time of year that the sheep is graded. Also it tends to be lower, i.e. more woolly faced, for the two-tooth ewes which have a greater amount of wool because their previous shearing as hoggets took place before the rest of the flock. In addition, a sheep growing well tends to grow more wool and this may result in other effects associated with face cover being obscured. Therefore the face cover grading has been broken down into two components: (a) a face-grading which is a grade for the area of the face which is actually

growing wool, regardless of the length of wool grown, and (b) an eye grade which measures to what extent the eyes are obscured by wool growing over them. The significance of this double system of grading will be seen when fleece weights are discussed.

The face grade, F 1, is used to describe sheep in which the wool extends well down the nose. Grade F 2 is given when the wool is forward of the eyes and Grade F 3 is given when the nose is free of wool and there is a clear area in front of and below the eyes. Grades F 4 and F 5 indicate that the wool is receding over the poll. The eye grades E 0 and E 1 describe sheep with the wool long enough and of the type to cover the eye, E 0 being the wool blind sheep. Eye grades E 2 and E 3 represent wool level with the eye and clear of the eye respectively.

THE EFFECT OF FACE COVER ON FERTILITY.

The results on fertility from the Sheep Breeding flock using the original face cover grade are shown in Table 1. In this table results have been summarised for each of the three years for all age groups. The percentages are based on the number of ewes graded in the particular year. All lambs born have been included whether they died later or not. There were no consistent effects of the face cover of the ewe on lamb deaths and the percentages at weaning therefore follow the percentages obtained at birth. The consistently poorer performance of the woolly-faced ewes is clear, the differences in lambing percentage being the result of differences in both the proportions of ewes having twins and of those which are dry. A chi-square analysis of the totals for the three years shows that the differences between the woolly-faced ewes and the rest are highly significant (P less than 0.1%).

It can be seen from Table 2 that the woolly-faced ewes have given a poorer lambing performance in all age groups except the two-tooths. A more detailed analysis of the results from the two-tooth ewes showed that the differences were not consistent from year to year. In 1953 and particularly in 1955 when the two-tooths made up a large proportion of the flock, the woolly-faced two-tooth ewes gave a slightly better lambing percentage than the open-faced ewes of this age. In 1954, however, the differences were reversed, the open-faced two-tooth sheep being superior. Since the two-tooth ewes were shorn as hoggets about six weeks earlier than the remainder of the ewes, the face cover grading may have been affected by the extra amount of wool grown. To what extent this accounts for the different fertility results in this group cannot be decided until more data are available from the double grading system.

Table 3 summarises data obtained from flocks whose owners were co-operating in this investigation. Apart from Flock C the data confirm the better performance of the open-faced sheep. The sheep in Flock C were treated differently from those in the other flocks. They were shorn in March and therefore had little wool on their faces when they were graded in June. Whether this affected the accuracy of the grading or whether this pre-mating shearing affected fertility is impossible to tell at this stage.

THE EFFECT OF FACE COVER ON FLEECE WEIGHTS.

The fleece weights for the ewes of the Sheep Breeding flock classified according to the original face cover grade are shown in Table 4. In the top half of the table are shown the averages for each face cover grade for each year over the whole flock. These averages represent the production per ewe in each group without allowing for

the possible causes of any differences. There is a reduction in fleece weight between grades 1 and 3 with a further marked drop to grades 4 and 5. However, these last two groups had only a few ewes on which to base the averages.

In the second half of the table are shown the estimated mean fleece weights allowing for the effects of year, age of ewe and the fertility status of the ewe, i.e. dry or having single or twin lambs. The estimates were obtained by the solution of the appropriate equations in a least squares analysis. When the effects of age of ewe and the fertility status of the ewe are taken into account the differences between open-faced and woolly-faced ewes are considerably reduced. This similarity in fleece weight between woolly- and open-faced sheep was also found in a study of hogget fleece weights from a stud flock. There were no consistent differences amongst the dry two-tooths in the Sheep Breeding flock nor did results from the Face Cover flock show an increase of fleece weight for those groups with a greater area of the face growing wool; in fact, allowing for the number of lambs born, the open-faced sheep had heavier fleeces.

It is of interest to know to what extent the fleece weight differences shown in the top half of Table 4 are related to the area of face growing wool and to what extent they are due to the length of staple round the eye.

In order to investigate this point, fleece weights have also been classified according to both the face grade and the eye grade. The results are presented in Table 5.

The differences in fleece weight between the face grade classifications are small except for grades 4 and 5 in which there were few sheep. Within the face grades 1 and 2 there is a drop in fleece weight for sheep which are not blind (eye grades 2 and 3). Comparisons of the original and double grading systems show that the difference between eye grades E0-E1 and E2-E3 with face grades F1 and F2 corresponds to the difference between grades 1 and 1 R. The difference in fleece weight between grades 1 and 1 R therefore may be partially associated with the length of wool grown on the face at the time of grading.

Further data are required to distinguish these effects but it appears that when both length of wool on the face and fertility status of the ewe are allowed for, then the association between the fleece weight and the area of the face producing wool may not be an important one.

THE EFFECT OF FACE COVER ON BODY WEIGHTS.

The weaning weights of lambs from the Sheep Breeding flock for 1955 classified by sex, birth-rank and grade for the area of the face growing wool are presented in Table 6. The differences are most marked for the ewe lambs and are in favour of the more open-faced lambs.

In the Face Cover flock there were differences in body weight at 16 months of age of 15lb. in favour of the open-faced group. These weight differences were associated with differences in body size as indicated by the elbow-coronet length measurement, which averaged one centimetre more for the open-faced sheep.

DISCUSSION.

The evidence presented shows that fertility differences are associated with the extent and length of wool on the face of the Romney ewe. The reasons for this are under investigation and the results using the separate grading systems on as many sheep as possible together with results from the Face Cover flock, should indicate whether the problem is associated with wool blindness or with the production of wool on certain areas of the face.

A direct approach is also being made in order to determine the reasons for the fertility differences between the groups. Some preliminary data are available from the Face Cover flock on behaviour at tupping. It was found that 53% of the open-faced ewes conceived to the first tupping compared with 23% for the woolly-faced sheep; in addition the latter group contained three ewes which were anoestrous throughout the mating season. These results suggest that investigations on the fertility aspects should be centred on the breeding season. One effect of this difference is that the open-faced ewes lambed significantly earlier than the woolly-faced groups. This could affect the performance of their lambs although body weight differences still occur at weaning when the ages of the lambs are taken into account.

It must be stressed that the relationships shown between face cover and fertility, fleece weight and lamb growth are phenotypic in nature. The genetic relationships underlying the phenotypic ones have still to be estimated. However, a preliminary estimate of the heritability of the original face cover grade is 0.4 (based on 361 degrees of freedom) and for the area growing wool the value ranges from 0.6 to 0.7 (354 degrees of freedom).

Further evidence on the inheritance of face cover comes from the birthrank of the ewes in the various face cover groups in 1954. Only 56% of the ewes graded as woolly-faced were born as twins while 68% of the open-faced ewes were born as twins. Thus selection of the open-face ewes also tends to favour the selection of the animals that are twins. More data are required to investigate this further but all these results indicate that progress should be made in increasing the fertility and thrift of the Romney sheep by selection for an animal without wool on the face forward of the eyes.

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TABLE 1.

Fertility of the Sheep Breeding Flock Classified According to Face Cover Grades and Years.

(The percentages are based on the number of ewes graded. All lambs born, dead and alive, are included.)

		1953		
Grades	Woolly	Intermediate	Open	
No. of ewes	151	155	115	
Ewe deaths	7	8	4	
% Dry Ewes	5.3	1.3	4.4	
% Ewes having twins	38.4	48.4	49.6	
% Lambs born	129.8	146.5	146.1	

		1954		
Grades	Woolly 1 & 1R	Intermediate	Open	
No. of ewes	197	2	3, 4 & 5	100
Ewe deaths	3	3		3
% Dry Ewes	14.2	11.9		7.0
% Ewes having twins	21.3	33.1		38.0
% Lambs born	105.6	118.6		128.0

		1955		
Grades	Woolly 1 & 1R	Intermediate	Open	
No. of ewes	249	2	3, 4 & 5	65
Ewe deaths	2	1		—
% Dry Ewes	13.3	7.9		7.7
% Ewes having twins	27.7	40.6		24.6
% Lambs born	114.1	131.7		118.9

		Total		
Grades	Woolly	Intermediate	Open	
No. of ewes	597	374		280
Ewe deaths	12	12		7
% Dry Ewes	11.6	6.4		6.1
% Ewes having twins	28.3	41.4		39.7
% Lambs born	115.2	133.7		132.9

TABLE 2.

Fertility of the Sheep Breeding Flock Classified According to Face Cover Grades and Age Groups.

(The percentages are based on the number of ewes graded. All lambs born, dead and alive, are included.)

Grades	Two-tooth Ewes.		
	Woolly	Intermediate	Open
No. of ewes	285	84	46
Ewe deaths	4	1	1
% Dry Ewes	16.1	15.5	17.4
% Ewes having twins	19.3	15.5	10.8
% Lambs born	102.1	98.8	91.3

Grades	Four-tooth Ewes.		
	Woolly	Intermediate	Open
No. of ewes	118	73	36
Ewe deaths	2	—	—
% Dry Ewes	11.9	6.9	2.8
% Ewes having twins	25.4	39.7	38.9
% Lambs born	111.9	132.9	136.1

Grades	Six-tooth Ewes.		
	Woolly	Intermediate	Open
No. of ewes	105	113	79
Ewe deaths	2	5	—
% Dry Ewes	4.8	3.5	3.6
% Ewes having twins	47.6	50.5	54.4
% Lambs born	142.9	146.0	154.4

Grades	Full-mouth Ewes.		
	Woolly	Intermediate	Open
No. of ewes	89	104	119
Ewe deaths	4	6	6
% Dry Ewes	4.5	1.9	4.2
% Ewes having twins	38.2	53.8	41.2
% Lambs born	129.2	149.0	133.6

TABLE 3.

Fertility in Other Flocks According to Face Cover Grade.

(The percentages are based on the number of ewes graded.)

Flock	Description	Lambing Percentage.		
		Woolly	Intermediate	Open
A	Stud 2-ths graded Jan.		89.5	100.0
B	Stud 2-ths graded June	112.6	137.0	171.4
C	Flock 2-ths graded June	122.6	130.0	116.9
D	Flock Mixed ages graded June	111.5	110.8	117.3

TABLE 4.

Average Greasy Fleece Weights of Ewes Classified According to Face Cover Grades (Sheep Breeding Flock).

Grades	Overall Averages (lb.)				
	1	1R	2	3	4 & 5
1954	11.95	11.34	11.04	11.04	10.56
1955	11.55	11.26	10.95	11.34	10.15

Estimated Means allowing for Year, Age of Ewe and Fertility Status.					
	1	1R	2	3	4 & 5
	11.31	11.15	11.00	11.31	10.77

TABLE 5.

Average Greasy Fleece Weights (lb.) Classified According to Face Grade and Eye Grade, 1955.

Face Grade	Eye Grade	0 & 1	2 & 3	Total
1		11.70	10.90	11.58
2		11.47	11.08	11.22
3			11.29	11.29
4 & 5			10.24	10.24
<u>Total</u>		11.56	10.60	<u> </u>

TABLE 6.

Weaning Weights (lb.) of Lambs Classified According to the Grade for the Area of the Face Growing Wool, 1955.

Face Grade	Ewe Lambs.			Wether Lambs.		
	1	2	3	1	2	3
	Ex Four-, Six-tooth and Full mouth Ewes					
Singles	61.9	66.7	70.7	69.8	69.9	67.5
Twins	52.5	58.3	60.5	58.3	61.7	—
	Ex Two-tooth ewes					
Singles	53.7	60.0	—	56.8	60.1	—
Twins	46.4	42.6	—	47.4	50.0	52.0