

POLLED RAMBOUILLET BREEDING

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A considerable number of ranchmen in the Southwest prefer polled rams as they are less subject to head injuries with their attendant screw worm trouble. Flocks of polled Rambouillets have been bred for some years. Due to the shortness of the selection period and the lack of knowledge of the inheritance of this character, the polled Rambouillet flocks have continued to produce many horned ram lambs.

Typical horned stock Rambouillet and Merino rams have large horns while the ewes though lacking typical horns always have protrusions of the skull or knobs at the poll which may or may not break through the skin to form seurs. Detailed examination of several hundred progeny of horned rams and ewes with knobs of both the Rambouillet and Merino breeds has shown that the ram lambs all had horns and the ewe lambs had knobs or seurs.

Five purebred Rambouillet rams which had good polled heads, and were of polled breeding were bred to horned stock ewes (with knobs or seurs). Four of them produced both polled and horned offspring. The other one produced males with either depressions or seurs but none with horns and females with depres-

sions only. Similar results were obtained when these same rams were bred to ewes which had depressions but were from horned sires. The results are given in Tables 1, 2 and 3. They show that polled is dominant over horned in both sexes.

The actual ratios of the different groupings in Table 1 are all within the limits of normal sampling for a 1:1 ratio (2). The females show the widest deviation of any group. Here the probability of a deviation as great or greater is .2648. If two factors were involved, these crosses should give us 3:1 ratios. When the data for the sexes are combined the actual ratios are outside the limits of sampling for a 3:1 ratio, the probability of as great or greater deviations being less than .0001. In the matings shown in Table 2, the ratio should be 3:1 if one pair of factors is operating; 15:1 with two pairs. The widest deviation from a 3:1 ratio is shown by the small F_2 group. The probability of a deviation as great or greater is .0344 which is still within the limits of sampling. However, if we considered 2 pairs of factors and a 15:1 ratio, we would find that the probabilities of deviations as great or greater for F_2 or the combined data were less than .0001 in each case. The fact that horned rams and knobbed ewes produced only horned male and knobbed female progeny practically eliminates the possibility of two pairs of complementary factors resulting in a 9:7 ratio, even though our figures are otherwise within this possibility. Accordingly, we consider it practically certain that this character is due to one principal pair of factors, which we may designate as follows:

<u>Males</u>	<u>Females</u>
HH, polled	polled (depressions)
Hh, polled or scurred	polled (depressions)
hh, horned	horned (knobs)

In 1912 Arkell (1) reported on the inheritance of horns of this type, together with that of the Dorset type. He considered horns of Rambouillets and Merinos to be dominant over polled in the male and recessive in the female, with a sex-linked inhibitor to account for the difference in the phenotypes of the sexes. The numbr of F_1 males raised by him was extremely small and the merest trace of horn tissue was called a horn. These facts together with the natural inclination to harmonize the hypotheses for the two kinds of horns, probably explain why dominance was erroneously interpreted in the male. It is not necessary to postu-

TABLE 1. PROGENY OF HETEROZYGOUS POLLED SIRE X HORNED STOCK EWES (KNOBS).

Sire	Males			Females			Both Sexes		
	"Polled"			"Horned"			"Horned"		
	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)
I	8	0	7	3	3	5	11	14	12
II	6	1	9	7	7	9	14	18	18
III	1	0	1	1	1	2	2	2	3
IV	1	0	1	0	0	2	1	1	3
Total	16	1	18	11	11	18	28	28	36

TABLE 2. PROGENY OF HETEROZYGOUS POLLED SIRE X HETEROZYGOUS EWES (DEPRESSIONS).

Sire	Males			Females			Both Sexes		
	"Polled"			"Horned"			"Horned"		
	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)
I	0	0	0	2	2	3	2	2	3
II	8	2	5	12	12	0	22	22	5
III	1	0	1	0	0	0	1	1	1
Total	9	2	6	14	14	3	25	25	9
F ₁ M x F ₁ FF	2	0	3	3	3	3	5	5	6
Total	11	2	9	17	17	6	30	30	15

TABLE 3. PROGENY OF HOMOZYGOUS POLLED RAM.

Dams	Males			Females			Both Sexes		
	"Polled"			"Horned"			"Horned"		
	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)	(Depressions)	(Scurs)	(Knobs or scurs)
With knobs	39	33	0	90	90	0	162	162	0
With depressions	12	5	0	12	12	0	29	29	0

late a sex-linked inhibitor to explain the difference in the phenotype according to the sex, as this is due to the difference in internal secretions of the sexes, as shown by castration. We would also suggest that in the case of the Dorset type horn, that the polled instead of the horned condition might equally well be considered dominant in both sexes, inasmuch as there is no question about the horned of the F_1 Dorset x polled males being much smaller than those of the parent Dorset.

Our interpretation of the inheritance of polled and horned in sheep demonstrates another case of parallel inheritance in different species, as it is in line with the inheritance of the same character in cattle and in goats.

REFERENCES

- (1) Arkell, T. R. 1912. Some data on the inheritance of horns in sheep. New Hamp. Exp. Sta. Bul. No. 160.
- (2) Warwick, B. L. 1932. Probability Tables for Mendelian ratios with small numbers. Texas Exp. Sta. Bul. No. 463.