

VIII. CORRELATION STUDIES INVOLVING FACTORS THAT INFLUENCE THE QUALITY OF THE FLEECE IN THE RAMBOUILLET SHEEP.

A. E. Darlow and W. A. Craft, Oklahoma A. and M. College

This paper is a preliminary report of correlation studies of wool started in 1925. This study includes all fleeces obtained from the college flock each year and represents the following breeds: Rambouillet, Dorset, Shropshire, Oxford, Hampshire and Southdown.

At shearing time, the weight of fleece is recorded and two small samples are taken from the side just behind the shoulder. One of these samples is used for determination of shrinkage and the other for the study of other factors involved in the study. The characters studied in addition to weight and shrinkage are: Diameter of Fiber, Length of Fiber, Stretch, Breaking Strength and Crimp per Inch.

The diameter of fiber is determined by use of a Brown-Sharp micrometer caliper and is expressed in ten-thousandths of an inch. The fibers are all drawn from the skin side of the fleece and all are measured the same distance from the base end of fiber. Koehler (1924) has compared the measurements from this caliper with microscopic measurements and concluded that one ten-thousandth of an inch should be added to the caliper measurements. The MacKenzie Fiber Testing Machine is used for stretch and breaking strength of fibers. Care is taken when the fiber is placed in the MacKenzie fiber testing machine that the part that was between the jaws of micrometer caliper when measuring diameter is not included in the portion between the jaws of testing machine. This is to avoid errors that might be due to the crushing of the fiber when measuring diameter.

All samples are scoured in benzine and in order to avoid selection fibers are drawn consecutively from one side. Fifty fibers are taken from each sample or fleece and the measurements recorded on each fiber are Length, Crimp per Inch, Diameter, Stretch, and Breaking Strength. These measurements are entered on a table prepared for same and each character is studied in relation to every other character making in all ten correlation tables for each fleece. This will be increased when we study all of these in relation to shrink

The coefficients have been determined by the use of a calculating machine according to the method recommended by Wallace and Snedecor (1925).

Ten correlations have been determined for each of eleven

different Rambouillet fleeces. Only simple correlations have been used, later multiple relationships will be studied. Correlation coefficients are being determined for the following: Diameter and Length; Diameter and Crimp per Inch; Diameter and Stretch; Diameter and Breaking Strength; Length and Crimp per Inch; Length and Stretch; Length and Breaking Strength; Crimp per Inch and Stretch; Crimp per Inch and Breaking Strength. The coefficients for Diameter and Length average $+0.36 \pm 0.08$. Eight of the eleven coefficients are sufficiently high to be considered significant. While one fleece gave a negative correlation of -0.42 ± 0.08 . Diameter and Crimp per Inch gave very low coefficients. Seven fleeces gave negative coefficients and four positives. The negative group averaged -0.14 and the positive $+0.15$.

Diameter and Stretch of fiber showed the greatest amount of variation in the determinations. Five fleeces gave a negative coefficient and 6 positive. The negative group varied from -0.05 to -0.26 and averaged -0.15 . While the positive group ranged from $+0.02$ to $+0.88$ with an average of $+0.32$. Two fleeces among the positive determinations gave a coefficient of $+0.88 \pm 0.03$. Our data are too meager to provide an explanation for these cases, but we hope to find the cause for the variation in this group.

The highest coefficient found in these calculations was for Diameter and Breaking Strength. Here the coefficients were all positive with a range from $+0.48$ to $+0.95$ with an average of $+0.63 \pm 0.05$. This suggests, what would naturally be expected, that as the fibers increase in diameter their strength increases also.

In these calculations the coefficients for crimp per inch and stretch of fiber are very low, seven were negative and averaged -0.15 , four were positive and averaged $+0.15$. The coefficients average higher for crimp per inch and breaking strength, six were positive, averaging $+0.41$, while five were negative and averaged -0.30 .

It appears that there is probably a significant relationship between stretch and breaking strength. The coefficients are all positive with a range from $+0.10$ to $+0.63$ and average $+0.44 \pm 0.06$.

Since this is only a preliminary report and includes a small number of samples the suggestions herein are not considered conclusive.

Literature Cited

- Koehler, W. F. 1924. Comparison of microscopic and micrometer caliper measurements.
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Wallace, H. A. and G. W. Snedecor. 1925. Correlation
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