Biological Sciences

THE INHERITANCE OF HAIR WHORLS

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(Abstract)

A study of the inheritance of hair whorls in swine was undertaken at the Oklahoma Station in 1924 as a by-product to other project studies. These are commonly called swirls and they occur in the mid-dorsal line over the rump, over the shoulder and over the snout. The one over the rump is seen more frequently than the one over the shoulder. So far the swirl over the shoulder has not been observed in the experimental stock. During the course of these observations twelve-thousand head of market hogs have been inspected for swirls. Two animals were observed which had two swirls, one over the shoulder and one over the rump. Because of the difficulty in recognizing the rhinal swirl no effort was made to record its occurrence on market hogs. For the same reason it was not observed on the experimental animals for some time after the study was begun. Swirls over the rump or over the shoulder were observed on 1.4 per cent of the market hogs inspected, but only .98 per cent of the sows observed on the market had a swirl.

These swirls are very objectionable in purebred herds, and breeders have to some extent selected against them, but still the character occurs from time to time. However, all swine breeders are not convinced that swirls are hereditary. When this study was undertaken it was thought that the character was inherited as a simple recessive, accordingly matings were made to test this hypothesis. However, it at once became evident that it did not behave as a simple recessive.

In the experimental stock when only the male parent had a swirl 29 per cent of the pigs have had it; when a swirl was present on only the female parent 25 per cent of the pigs had it. But when both parents had a swirl 59 per cent of the pigs had it. From F_1 matings where neither had the swirl 13 per cent of he F_2 pigs have shown it.

At present three-hundred and eighty-nine progeny have been produced and the data suggest the hypothesis that the swirl over the rump is an hereditary character caused by the interaction of two dominant genes. Obviously to test this hypothesis it is necessary to test a number of different genotypes. So far some have been adequately tested but all have not. Only two phenotypes occur; namely, swirl and non-swirl. But according to the hypothesis suggested, several different genotypes occur in each phenotypic group. Therefore, it is evident that it is not a small task to adequately test all of the possible genotypes.

At present our data does not solve the occurrence of the swirl over the snout. This swirl does not occur on all of the pigs, but it appears that it may be hereditary, and in some way possibly related to the genes suggested.

Everyone familiar with the pelage of mammals knows that the hair slopes backward but that there are certain areas where a reversal of the hair always occurs due to conformation or other natural causes. The direction of hair has received considerable attention and many theoretical attempts have been made to account for the direction of hair growth and the

reversals in the hair stream but little attention has been given to inheritance.

In a study of the genetics of rosettes in the guinea pig Pictet and Ferrero (1929) suggest a single dominant gene (R) for rough; a dominant gene (G) causing a spread of the rosettes over the body; the recessive gene (g) limiting the rosettes to the lumbar region; and another dominant gene (D) permits the development of rosettes on the head in the presence of (R). A comprehensive review of the literature and discussion of hair direction was given by Landauer (1925).

Numerous sections of the skin from swirl areas of embryo pigs have been studied and it is clear that hair in these areas comes from the skin reversed in some manner from the normal backward trend of the hair stream. The reversal begins at the base of the follicle in the dermis. The same histological picture is presented in the skin of embryo guinea pigs from rough coated parents. Some of the histological observations were made from embryos before there was any evidence of hair in the follicles and this reversal was clearly evident.

REFERENCES

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