

XXII. OBSERVATIONS ON VARIATION AMONG INBRED AND OUTBRED STRAINS OF GUINEA PIGS.

W. A. Craft, Oklahoma Agricultural and Mechanical College.

These observations were made in connection with another experimental study at the Oklahoma Agricultural Experiment Station. Two different stocks were used, namely A and B. The A stock was developed from mating a vigorous smooth-coated-pink-eyed white male with ten different females, all of which were from strong stock, and the B stock was developed by mating a cream-rough-male to the same females, alternately.

Half-brother x half-sister matings were used to produce the inbred group. Weights were taken at birth and at 30 day intervals for use in measuring the differences between the two stocks and the inbred groups. Since the stock was subjected to the same environmental conditions throughout, it would seem reasonably safe to assign whatever differences that are apparent to genetic causes.

The growth curves reveal clearly that the stock developed from the A male was superior in size to the stock developed from the B male. The mean birth weights from A stock was 4.85 grams greater than for the B stock, and the A stock showed less variability as measured by the standard deviation. The difference becomes more evident as the 180 day period is approached.

For the first generation of inbreeding each strain of the inbreds failed to reach the mean weight, for any period, of the stock from which it was developed. A further loss in growth, is shown for the second generation of strain A. It should be noted that the weights on the S₁ B inbreds are not given after 90 days. This is due to the fact that this strain was delayed because of the loss of some females at parturition and a few irregular breeders which showed up in this strain. The data are inadequate for analysis of this trait however.

The difference in growth for the different groups is evidently due to a loss of heterosis which is a common experience in inbreeding. These results are of interest because of the differences between the two stocks developed from the same females mated to two different males. These males were not only vigorous in appearance but were equal in growth as evidenced by their weights being practically the same throughout. The A male was an attractive individual, smooth and symmetrical in conformation, while the B male was unattractive and lacked symmetry in conformation, being long in body and pinched in the heart girth. The latter characteristic did not appear in the offspring, however. Since ten different females were mated alternately to these two males and 100 male offsprings grown to 180 days for each stock it would seem that there was a significant genetic difference for size and growth between the two males as evidenced by their progeny. Data on male offsprings only are used because a number of the females were mated at 90 days, therefore, weights of these would not be reliable criteria. The mean weights and the variation for the females up to 90 days is practically the same as for the males.

The standard deviations were calculated on the males for each 30 day weight. Although the standard deviation reveals a slight difference which suggests less variation in the weights for the A group, it is too small to be considered significant. The standard deviations at birth and thirty days are smaller for the inbreeds of each group than for the same consideration for the outbreeds. Except for the birth and 30 day weights there is considerable irregularity in the standard deviations.

Correlation coefficients were calculated in studying the relationship between birth weights and weight at 30 days intervals up to 180 days. A significant correlation exists between birth weight and the weight attained at 30 days (ranged from plus .44 plus or minus .10 to plus .86 plus or minus .03) but the size of the coefficient decreases as the 180 day weights are approached, and for birth weight and 180 day weights it too small to be of value.

The stock was also divided into two groups and the coefficient calculated as follows: first, for litters of one and two and second, for litters of three and over. For each group the relationship as expressed by the coefficient for them taken together did not change appreciably. The coefficient for birth and 30 days was plus .68 plus or minus .028 for the first group and plus .66 plus or minus .025 for the second. While the coefficient for birth and 180 days was minus .118 plus or minus .09 for the former group and plus .126 plus or minus .06 for the latter.