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DEPARTMENT OF POULTRY HUSBANDRY

DEVELOPING EARLY-FEATHERING STRAINS IN HEAVY BREEDS OF POULTRY*

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Market discriminations against bare-backed broilers have aroused interest in how this problem may be overcome. Although extreme early feathering is ordinarily limited to the smaller breeds like the Leghorn, it is found in an occasional individual of the heavy breeds. These early-feathering, exceptional individuals,which formerly were considered as undesirable, are now being utilized for the conversion of heavy breeds into early-feathering types. It is known that differences in feathering are inherited in a simple manner. Which makes the fixing of the early-feathering trait a relatively easy procedure,

Identifying Early Feathering in Chicks

The early-feathering characteristic, which eliminates barebacks at the broiler stage, is more easily recognized in the early-chick stages than at the broiler age. At the 10- to 12-dayage early feathering is recognized by the presence of well developed tail feathers and wing feathers which, when folded, reach the tail or beyond. Chicks lacking the early-feathering trait will at the 10-day age possess no well developed tail feathers and the wings will extend about two-thirds the way from the shoulder to the tail. The early-feathering type also may be readily identified in the chick as it comes from the incubator. The type of feathering can more accurately be recognized at about 24 hours after hatching. In the day-old stage the wing feathers are incased in a sheath which gives them a needle-like appearance. When the chick wing is spread it can be seen to be divided into two sections. (Fig. I.) The outer portion carries the primary feathers and the inner portion the secondaries. The major difference between newly-hatched, early-feathering and late-feathering chicks is the length of the primaries, although this cannot be depended upon exclusively. In such questionable chicks distinction may be made by more critical examination of the primary feathers. Each primary feather has closely associated with it a covert feather, which, in the early-feathering type, is more slender than the primary and only about two-thirds or three-fourths its length. If the coverts, are about the same diameter and length as the primaries, the chick is late feathering regardless of the feather length. In the

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more common late-feathering type the wing feathers will be so poorly developed that identification easily may be made, but the relative lengths of the primaries and coverts aid in identifying late-feathering chicks with exceptionally long wing feathers. It has been found that among the early-feathering individuals, those having the highest number of secondaries are of the earliest feathering tendencies. So in the initial stages of establishing an

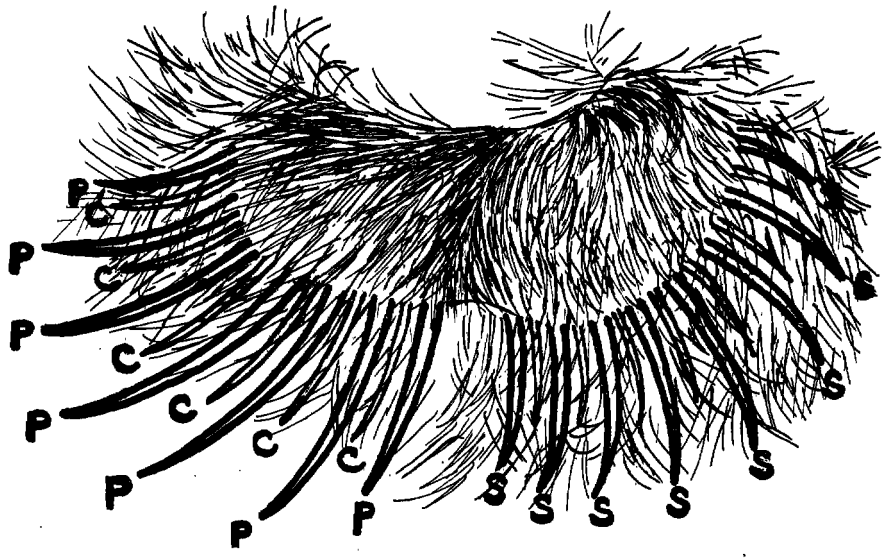

Figure 1. A diagram of the wing of a day-old, early-feathering chick. (P) Primary flight feathers. (S) Secondary flight feathers. (C) Primary coverts which are seen to be about two-thirds the length of the primaries.

early-feathering strain, one probably should also eliminate those chicks with too few secondaries. The secondaries vary in number from two to eight which conspicuously show in the down. The highest number is desirable but good broiler feathering can be expected when the number of secondaries exceeds three. The nature of the wing feathering most easily can be seen by spreading the wing and holding it between the eye and a strong light. The accompanying photographs bring out the differences emphasized. In classifying a group of chicks which are younger than 24 hours, the early-feathering chick will have slightly shorter wing feathers than are illustrated in Figure 2A: If the chicks are allowed to go beyond the ideal age, many of the late-feathering chicks may appear like the one illustrated in Figure 2C.

Matings for Establishing Early Feathering

If ones finds early feathering in both males and females, he needs only to mate them for producing a flock which will breed true for early feathering.

If early feathering occurs rarely in a flock, such individuals, are more likely to be females. For promptly establishing early feathering in a flock, it is desirable to obtain a male showing the trait, since females cannot trans-

mit the characteristic to their daughters. If only early-feathering females are found, they may be mated with any male and will produce only late-feathering offspring. (Fig. 3.) Their daughters will be of no value for breeding, but their sons, though showing late feathering, will be able to transmit the early-feathering traits to their own offspring. These sons, if mated with other early-feathering females (to avoid inbreeding), will then produce male and female offspring half of which will be early feathering. When early-feathering males and females are mated together, all the offspring will be early feathering and will breed true thereafter unless new blood is introduced into the flock. Any time it becomes desirable to introduce stock of new blood and of unknown feathering tendencies, it should be done through the use of females whose sons will be discarded. Their daughters will be early feathering if mated with an early-feathering male. In making the original mating of the early-feathering female, there is a rare possibility that the late-feathering male chosen for the mating might chance to be of the *Le* type shown in the chart, and, if so, one will get the results shown in the illustration of an *Le* male by an early-feathering female. Early-feathering males, and females of either the late or early type, transmit only what they show, but late-feathering males may either breed true for late feathering or transmit both late and early feathering to their offspring.

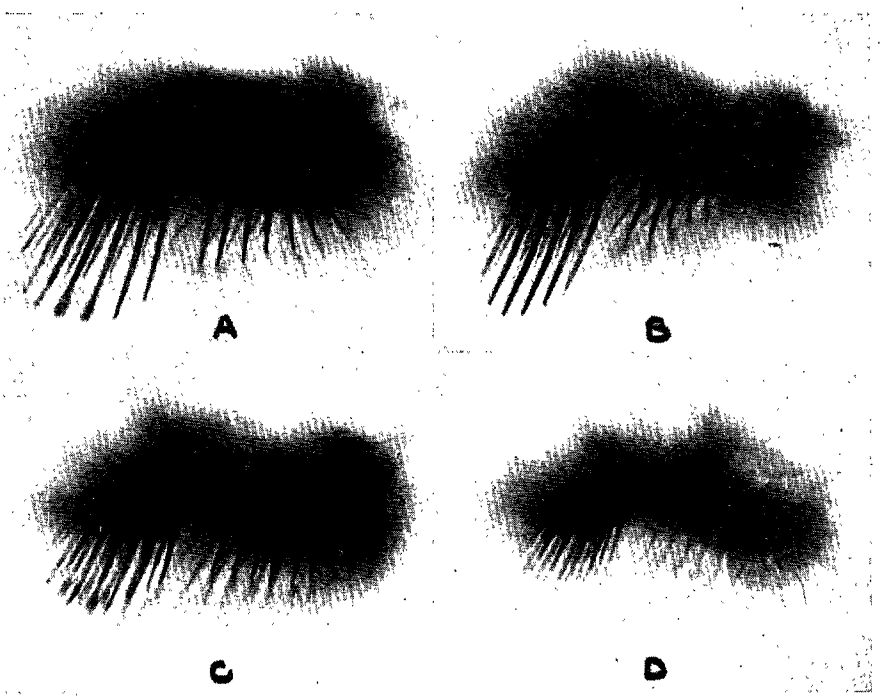

Figure 2. Wings removed from the bodies of day-old chicks and photographed with a strong light showing through the wing in the manner they are ordinarily examined. (A) An ideal early-feathering wing, showing well developed primaries with the associated coverts only about two-thirds of their length. This wing shows seven well developed secondaries. (B) Another early-feathering chick wing which does not have the ideal complement (has only four) of well developed secondaries. (C) The wing of a late-feathering chick with exceptionally long feathers which might cause one to class it as early feathering. Note that the coverts are virtually the same length as the primaries. (D) The usual type of wing of a late-feathering chick which is readily distinguished from that of an early-feathering chick.

If one has available only an early-feathering male, the fixing of the trait in a flock is much easier than in a case where one is limited to the female sex. The former situation would probably exist only where one has no early feathering in his flock and purchases a breeding male for the introduction of the trait. When such a male is mated with late-feathering females, all the female offspring will be early feathering. The male offspring will be late feathering but will be able to transmit early feathering. The early-feathering daughters, if mated with another purchased, early-feathering male (to avoid inbreeding), will produce only early-feathering offspring. These females could be mated with their late-feathering brothers, and half the male and female offspring will be early feathering. Thus, it is a relatively simple matter to fix early feathering in a flock previously not carrying the trait, by the purchasing of an early-feathering male. The complete conversion from a late- to early-feathering flock can be made in two years. The conversion is ordinarily 100 percent, but in case there might be something peculiar about the inheritance make-up of one's own flock, it might be well the first year after conversion to examine the birds at the 8- to 10-weeks age and eliminate any individuals showing any tendency toward bare-backness. Such birds are not likely to be found, but this added precaution the first year might be desirable. The accompanying chart shows the results of various types of matings, utilizing early-feathering individuals in order to obtain both males and females of the early-feathering type. When this is accomplished and two such individuals are mated together, a true-breeding strain will result.

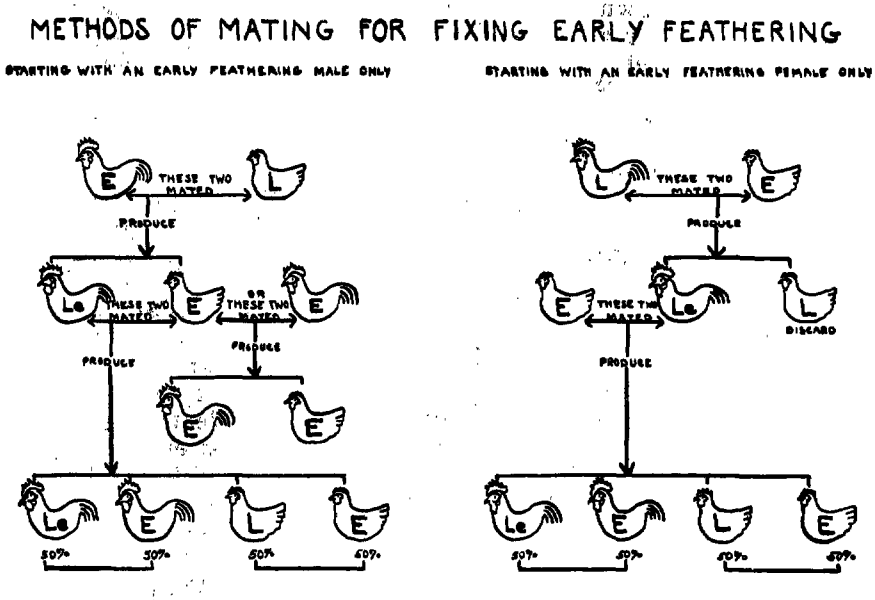

Figure 3. A chart showing methods of mating for the establishment of true-breeding, early feathering. The birds carrying the letters E and L are true-breeding, early and late feathering, respectively. The symbol *Le* represents a late-feathering male which is able to transmit both late and early feathering to his offspring. It is necessary to keep in mind the sex of the individuals used in the matings. The end result in each case illustrated is to produce at least some early-feathering individuals of each sex which may be mated together to initiate the true-breeding strain.