

INHERITED CONGENITAL BALDNESS IN THE
DOMESTIC FOWL*R. George Jaap, *Stillwater, Oklahoma*

Among the mutations in the domestic fowl Hutt** reported a condition which he designated as "supra-orbital featherless areas." These small irregular spots on top of the head were entirely devoid of down at hatching and feathers at all subsequent stages. Hutt concluded that this condition was apparently inherited as a simple mendelian recessive. Chickens having similar bald areas have been observed at the Kansas and Connecticut Agricultural Experiment Stations.***

At the Oklahoma Agricultural Experiment Station baby chicks from three standard varieties; Single Comb Rhode Island Red, White Plymouth Rock, and Single Comb White Leghorn, have hatched with bald spots on their heads.

Regardless of their location the bald areas are entirely devoid of down before or after hatching and feather papillae are always lacking. Although the outlines of the affected areas tend to be irregular they occur in three definite regions on top of the head; namely, above the right eye, above the left eye and posterior to the comb. Occasionally a chick may have a certain combination of any two of these types but thus far a combination of all three has never been observed.

The original bald stock arose as "sports" from normal feathered individuals. When bald males are mated to related non-bald females the results (Table 1) demonstrate that baldness is not inherited as a simple

*From the Department of Poultry Husbandry, Oklahoma Agricultural Experiment Station.

**Hutt, F. B. 1932—Proc. VI Internat. Congr. Genetics 2: 96-7.

***Personal communication.

recessive character. Instead of obtaining a similar number of bald and non-bald progeny, from these matings there are more than three times as many non-bald chicks.

TABLE I. PROGENY OF BALD MALES AND NON-BALD FEMALES

Sire	Dam	Heads feathered	Bald Spots	Total
	x8162	14	2	16
	x8163	20	8	28
	x8166	9	0	9
	x8167	18	13	31
	x8170	30	10	40
M322	x8173	35	7	42
	x8174	22	0	22
	x8176	22	10	32
	x8177	18	0	18
	x8178	6	3	9
	x8184	5	2	7
	x8170	26	10	36
	x8173	9	0	9
N111	x8176	17	2	19
	x8811	26	3	29
	x8812	19	8	27
Total		296	78	374

TABLE II. PROGENY PAIRED MATINGS OF BALD INDIVIDUALS

Mating	Heads feathered	Location of Bald Area					Total bald
		Right	Left	Both sides	Center	Center and Right and Left	
Bald right X bald right							
3	6	1		1	1		3
64	13	4	6	2	2		14
68A	2				1		1
68B	4	3			3		6
Total	25	8	6	3	7		24
Bald left X bald left							
1A	9		3	3	3		10
1B	11	2			2		4
2B	4	5	5		5		15
66A	12	3	6		4	2	15
Total	36	11	14	3	14	2	44
Bald right X bald left							
70A	9		5		2		10
70B	12	7	7	3	4		21
65B	10	1	2	1	1	1	6
Total	31	11	14	4	7	1	37
Bald center X bald right							
65A	2	3	3		4	1	11
Bald center X bald left							
2A	4	6	5	2	4		18
Bald both sides X bald both sides							
67	7	4	8	1	8		22
Total	105	43	50	13	44	4	156
Miscellaneous bald spots located							
		14	9	3	6		32
Total Distribution	57	59	16	50	4	2	188

As shown in Table 2 bald individuals mated *inter se* do not breed true. These records demonstrate that, either more than one gene pair is involved, or certain conditions in the embryo's environment are responsible for an inhibition of the inherited baldness. Should the former be true, it should be possible to select a strain which would breed true for this character.

From a theoretical standpoint the asymmetrical expression of this character is interesting. Heritable characters are usually symmetrical in expression. For example, the color of our left eye is usually the same as the right one. The asymmetry of congenital baldness in domestic fowl would tend to indicate that the embryo's environment may be so variable that the action of a gene producing baldness would often be inherited.

Paired matings were made to determine whether the location of the bald area is inherited. These records, presented in Table 2, show no relation between the location of the baldness on the parents and their location on the offspring. By including all bald spots whose site has been recorded it is found that the affected area occurs as often on one side of the head as on the other. The number of the central bald spots is slightly less than half the number of the supra-orbital ones. Affected areas on both sides of the head occur in only about one-eighth the frequency of a single lateral bald area and only six cases out of 188 bald chicks have affected areas on one side as well as in the center. It is also noticeable that as the blood lines have been intensified the size of the bald area has increased slightly.

It is evident from the results from paired matings (Table 2) that some bald parents produce a larger percentage of bald offspring than others. This indicates that it might be possible to obtain a true breeding stock for this character. If this can be accomplished a study of the embryological changes in the development of these areas may prove of value to our understanding of the physiological action of the gene.

