

## [05]岐阜地鶏における羽装の遺伝学的研究

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# Genetic studies on plumage in the Gifu Native Fowl

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## Summary

In the Gifu Native Fowl (Gifu Jidori; Japanese native fowl originated in Gifu prefecture), adult male plumage is normally wild type and female is wild or wheaten type plumage. It is known that white plumage fowls have been occasionally produced from this breed. However, fowls with black feathers on the head and dorsal surface of the neck in either sex, and the males with Goshiki plumage have been found in this Gifu Native Fowl breed. The present studies were conducted to investigate the genes and its inheritance influencing the appearance of these plumage. Results obtained were as follows.

1) The gene that determines striped down and female wild type plumage is possibly  $e^+$  on E-locus, and the gene for yellow down and wheaten type plumage is  $e^y$ . It was found that estrogen was necessary for expression of female plumage by  $e^+$  or  $e^y$  gene. Consequently, female fowls with  $e^+ e^+$  or  $e^+ e^y$  genotype showed wild type plumage and  $e^y e^y$  females showed wheaten type plumage. However, the males showed only wild type plumage in spite of their genotype.

2) Male chicks of the Nankin Game showed yellow down, but when matured it changed into the wild type plumage. On the other hand, adult females showed wheaten type plumage. Test matings between the Nankin Game Fowl and the Japanese Long-tailed Fowl (as a standard;  $e^+ e^+$ ) were carried out to determine the gene on E-locus of the former. The results indicated that the Nankin Game Fowls ordinarily have  $e^{Wh}$  but in some cases they have  $e^+$  or  $e^y$  on E-locus. It is known that down color and adult female plumage of heterozygous chicks with  $e^{Wh} e^+$  show the same intermediate color between the two types of colors expressed by  $e^+ e^+$  and  $e^{Wh} e^{Wh}$  genotypes. However, in these matings some of the chicks with  $e^{Wh} e^+$  genotype showed yellow down and female wheaten type plumage.

3) Gifu Native Fowls with yellow down at hatch crossed to Nankin Game Fowls or Japanese Long-tailed fowls to determine the gene of E-locus for yellow down and female wheaten plumage in the Gifu Native Fowl. It was found that the gene for yellow down and female wheaten plumage in this breed could be  $e^y$ .

4) The result of matings between the two plumage types of the Gifu Native Fowl, white and colored plumage, revealed that white plumage fowls have  $c\ c$  genotype. Furthermore, it was suggested that  $c\ c$  genotype chicks with  $e^+ e^+$  or  $e^+ e^y$  on E-locus show buff down and the chicks with  $e^y e^y$  show yellow down.

5) The fowls with black feathers on the head and dorsal surface of the neck (Black-headed fowl) were found in this Gifu Native Fowl breed. The black feathers in males was recognized at juvenile, but disappeared at adult. However, in the females black feathers were maintained throughout their life. The mating experiments indicated that the gene produced black feathers on the head and the neck should be an autosomal dominant gene. This gene has not been reported previously. Consequently, I have named this gene Bh as a symbol. However,  $e^y e^y$  females with Bh gene produced no black feathers on the head and the neck but showed normal wheaten plumage. It was suggested that Bh gene had no effect on the plumage of wheaten females ( $e^y e^y$ ).

6) Sexing test for chicks with  $e^+ e^y$  revealed that about 85% of the chicks with well-defined stripe were female and 93% of the poorly-defined stripe were male. The  $e^+ e^y$  chicks with Bh bh genotype intensified their down color, and as the result the proportion of well-defined stripe chicks increased. Consequently, it is suggested that the Bh gene expresses clear stripe, since some of the male chicks with Bh bh genotype have shown well-defined stripe as seen in most of the females.

7) Two males with Goshiki plumage are found in the Gifu Native Fowl breed. These Goshiki males were mated with wild type females to determine the gene for Goshiki plumage. As a result of matings, the gene that exhibited Goshiki plumage seemed to be ig gene which showed Cream or Inhibitor of Gold plumage. However,  $e^y e^y$  females with ig ig genotype showed normal wheaten plumage. Therefore it is suggested that the ig gene had no effect on the plumage in wheaten female ( $e^y e^y$ ) as seen in females with Bh gene. Consequently,  $e^y e^y$  females with Bh bh ig ig genotype showed wheaten plumage with no black feathers on the head and the neck or Goshiki plumage.