GMR Genetics and Molecular Research
Online Journal
ISSN:1676-5680

Identification and association of single-nucleotide polymorphisms in gonadotropin-inhibitory hormone (*GnIH*) gene with egg production traits in Erlang mountainous chickens

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Genet. Mol. Res. 14 (1): 294-303 (2015)
Received March 26, 2014
Accepted October 6, 2014
Published January 23, 2015
DOI http://dx.doi.org/10.4238/2015.January.23.3

ABSTRACT. Gonadotropin-inhibitory hormone (*GnIH*) gene is an important gene in reproduction. In this study, we screened single-nucleotide polymorphisms (SNPs) in the chicken *GnIH* gene among 204 individuals in Erlang mountainous chickens. We then analyzed the associations between polymorphisms of the *GnIH* gene and 5 egg production traits in chickens. Five SNPs (T3305C, T3310C, G3403C, G3411A, and T3591C) were detected. Associations between polymorphic loci and age at first egg, body weight at first egg, weight at first egg, egg weight in 300 days, and egg production in 300 days were analyzed using analysis of covariance. The results showed that SNP1, SNP3, and SNP4 had large effects on age at first egg, while SNP5 had a large effect on body weight at first egg; of the effect of the TT genotype was significantly higher than that of CT ($P < 0.01$). Further

analysis show that the highest frequency (0.2353) haplotype H1H1 was associated with the latest age at first egg. The H4H5 haplotype had a positive effect on egg production in 300 days and a negative effect on weight at first egg. We observed no association between the H3H3 haplotype and body weight at first egg.

Key words: Egg production; Erlang mountainous chicken; *GnIH*

