

Development of SNP markers for individual identification in Thai native chicken

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Abstract

Individual identification using DNA markers are essential for traceability and management in animal production. Animal identification has been reported in cattle and pigs. However, information on molecular markers for individuality of chickens is limited. The objective of this study was to develop the single nucleotide polymorphism (SNP) markers for genetic individual identification in Thai native chicken (Praduhangdam). An Amplified Fragment Length Polymorphism (AFLP) technique was performed to identify candidate SNP markers. A total 139 polymorphic bands were obtained from 64 AFLP primer combinations. From these markers, 30 AFLPs were converted into single nucleotide polymorphism markers for genotyping. One hundred individual Praduhangdam chickens were genotyped with Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) technique. The allelic frequencies of each SNP marker were estimated. Based on the frequency data, the Hardy-Weinberg equilibrium (HWE), polymorphism information content (PIC) and probability of identity (PI) of markers were analysis. Sixteen markers were found in HWE. PIC values of markers were 0.1-0.4 and the PI value was 8.49×10^{-9} . Thus, the change of a coincidental genotype match between 2 chickens was 1 in 117 million. Moreover, 16 highly informative SNP markers provided the PI value of 8.52×10^{-7} or 1 in 1.1 million. These markers demonstrated a minimal set of SNP with sufficient power for individual identification of chickens. The results in this study indicated that the developed SNP markers could be useful for discriminating the individuality of Praduhangdam chicken breed. Knowledge of these study provides a powerful approach for traceability in poultry and livestock species.

Keywords: SNP markers, Individuality, Thai native chicken