Application of DNA-Test to expedite breeding of chicken autosexing crosslines (Abstract)

Yanzhang Gong
College of animal science and technology, Huazhong Agricultural University, Wuhan, China
Corresponding author: Poultry@mail.hzau.edu.cn

ABSTRACT

It is necessary in modern chicken meat and egg production that the sex of chicks is distinguished at hatching, because only females are raised in egg-type commercial crosslines and it is encouraged to feed separately the males and females in meat-type lines. Traditionally, vent sexing, in which sex of hatching chicks is identified by specially trained, experienced sexers through visually observing if there exists rudimentary sex organ in the cloaca, is used. Currently, phenotypic markers controlled by sex-linked gene are used for autosexing in some commercial crosslines, and the characteristics used most popularly are early *vs.* late-feathering, silver *vs.* golden color of down, etc. However, there is limited time period(just during the infancy because the down is observed) to accurately identified the phenotype(and to deduce the genotype), and in the same time there would be some identification error. These result in longer time(at least 2-3 generations) for accomplishing the combination of lines, low accuracy for autosexing and high cost. We developed approaches to identify the phenotype in early/late feathering locus and genotype in silver/golden locus based on their controlling genes by DNA-test, and these broke through the time limit to distinguish,and increased the identification accuracy, and as a result, the breeding time of autosexing crosslines and the cost were reduced. A double PCR was used to distinguish the phenotype of early/late feathering based on the 176kb copy number variation(CNV) and this approach was to utilize in breeding the X*inhua* layer no.2(which was approved by national committee of animal genetic resources in 2016), the *Baoqiang* layer and *Sanyi* green shell layer crosslines. Based on the SLC45A2 which controlling the phenotype of Silver/golden, a PCR approach was developed to identify the genotype in this locus and utilized in the breeding of *Jingyang*(a dual types) crosslines. By using these approaches, the time needed for accomplishing the combination of lines could be saved at least 1/3(and for cost, at least 1/4), the accuracy of autosexing could arrive to above 99%. In addition, to decrease the time for DNA-test, the way of isolation of DNA, which would be used as DNA model in PCR, was improved and this made the time decreased to 3 hours from at least 10 hours.

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