

## Prolactin gene polymorphism and its association with ducks egg productivity

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The hormone prolactin (PRL) according to many authors plays a crucial role in the laying of birds, because the beginning of their incubation behavior is induced by increased secretion of this gene (Ishida et al., 1991; Shimada et al., 1991; Wong et al., 1991; Talbot and Sharp, 1994). The first studies of prolactin gene polymorphism were performed on chickens. Because the chicken PRL gene has been cloned and sequenced, most studies have focused on detecting polymorphisms in this gene. (Watahiki et al., 1989). Analysis of the effect of prolactin gene polymorphism in different species of birds is relevant because it allows to establish economically useful allelic variants useful for creating new lines. Polymorphism of the PRL gene of ducks (registration number in the bank gene AB158611) has been little studied. Some studies have shown that prolactin gene polymorphism has been associated with the laying and reproductive capacity of poultry (Kansaku N. et al., 2005). For this purpose, the polymorphism of prolactin gene loci (PRL) in duck populations of Chinese selection of Shaoxing and Shanma breeds was analyzed.

Research methods: zootechnical (obtaining sperm of drakes, artificial insemination of ducks, incubation of eggs), statistical (biometric analysis of data using modern computer programs), molecular genetic (DNA isolation, genotyping of animals by PRL gene by PCR and sequencing). Polymorphic loci of the PRL gene were studied using restriction enzymes: 1) *Dra I* in intron 1 (alleles *G* and *A*), 2) *Pst I* in exon 5 A1057 (alleles *T* and *C*) 3) *Xba I* in intron 1 A1057 (alleles *A* and *C*).

A total of 146 daughters of 12 Shaoxing drakes, 75 daughters of 11 Shanma drakes and 157 daughters of 6 germline chimeric drakes were examined. The drakes met the breed standard for live weight and exterior (National Standard of China, 2012). Egg productivity was assessed using the analysis of 10428 hatching eggs (total).

Analysis of the effect of gene polymorphism on the egg productivity of prolactin ducks found that animals with the *GG* genotype (*Dra I* in intron 1) have worse productive traits than animals with the *AA* genotype. Heterozygotes of *AG* show the dominance of the *G* allele over *A* (it is shown that heterozygotes of *AG* are worse than *AA*). Allele *A* has a positive correlation with egg production (1 and 6 months) and with the morphological parameters of the egg. No correlation was found between productivity and genotype of animals at the *S2* locus of the prolactin gene.

*Xba I* polymorphism in intron 1 of A1057 revealed a close to significant positive effect of the *C* allele on the live weight of ducks. The tendency to a significant negative effect of the *CC* genotype on egg size and a weak negative correlation between the egg index and the heterozygous *AC* genotype is shown. There is a tendency (close to significant) about the presence of a connection between the *CC* genotype and a decrease in the morphological size of the egg. Allelic variant *A* has a positive effect on egg size and weight, allelic variant *C* has a negative effect. In heterozygotes, the *C* allele is preferred.

Thus, the analysis of the influence of three SNP prolactin gene on duck egg productivity allowed to establish economically useful alleles: *A* (*Dra I* in intron 1) and *A* (*Xba I* in intron 1 A1057). The *C* allele (*Xba I* in intron 1 A1057) has a positive effect on the live weight of ducks. Thus, alleles *A* and *C* (*Xba I* in intron 1 A1057) of the prolactin gene are both economically useful and can compete for simultaneous selection for meat and egg productivity.

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