Marker-assisted Introgression of Blue Eggshell Color into a White Leghorn Line

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The objective of the present study is the demonstration of the efficient transfer of a specific monogenic trait maintained in gene bank, here blue egg shell color, into a contemporary high performing white egg layer chicken line by marker-assisted introgression. This project is part of the EU project IMAGE (Innovative Management of Genetic Resources). Blue eggshell color is inherited in a dominant way and is caused by a large insertion on chromosome 1 upstream of SLCO1B3 (Wang et al. 2013, Wragg et al., 2013). In 2016, six Araucana cocks were mated with ten White Leghorn (WL) hens. Two marker-assisted backcross generations (BC1 and BC2) followed by an intercross generation (IC) will be generated, aiming at a high performing homozygous blue layer WL-like line. Using breed/line specific markers at the introgression locus recombinant BC1 animals were detected. Out of these recombinants, animals with the highest proportion of the recipient genome and the highest degree of diversity were selected for mating of the BC2. The final IC is planned for end of 2019. Analysis of performance data of the BC1 and commercial WL revealed promising results. The mean laying rate of BC1 animals was 5.4 % lower than in the commercial line and measured 81.2 % in carriers and 83.6 % in non-carriers. The eggshell strength was on average 40 N in the BC1 and significantly lower than in WL (45 N). The mean egg weight of 61.6 g in BC1 hens was similar to the commercial line (62.2 g).

Keywords: chicken, marker-assisted, introgression, blue eggshell, White Leghorn