Implementation of optimum contribution selection in the Black Slavonian pig population

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Summary

Breeding programmes of indigenous pig breeds aim to balance genetic diversity within populations and the achievement of genetic improvement for important traits. The object of the present study was to apply optimum contribution selection procedures in the population of Black Slavonian pig and to find a balance between genetic gain and the loss of genetic diversity within the population. The genetic diversity parameters were assessed by analysing pedigree (n=6 099 records) and microsatellite data on 70 animals using the set of 23 microsatellite markers from the ISAG/FAO recommendation list. An evolutionary algorithm was applied to optimise selection for the number of piglets born alive and loss of genetic diversity. Three different scenarios were analysed: truncation selection based on BLUP breeding values; optimised selection based on restrictions on inbreeding rate; and optimised selection based on applying different weights on genetic merit and average coancestry. The average inbreeding coefficient, inbreeding rate, and effective population size were 3.24%, 2.12%, and 23.58, respectively. The average number of alleles per locus, expected and observed heterozygosity were 7.826, 0.685, 0,625, respectively. The application of the evolutionary algorithm showed a different distribution of candidates in mating plans when different constrains were applied. The application of optimised selection showed that genetic improvement can be obtained with reduced loss of genetic diversity.

Keywords: indigenous brees, genetic diversity, inbreeding, selection

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