Application of optimal contribution selection in Landrace and Large White pigs in Croatia

Dubravko Škorput¹, Marija Špehar², Zoran Luković¹

¹University of Zagreb Faculty of Agriculture, Svetošimunska cesta 25, Zagreb, Croatia (dskorput@agr.hr) ²Croatian Agency for Agriculture and Food, Svetošimunska cesta 25, Zagreb, Croatia

Summary

Selection for economically important traits in pigs is based on methods that require pedigree information. Such an approach results with the choice of related animals for parents of future generations, resulting with increased inbreeding rate in the population and impaired genetic diversity. Using optimal contribution selection balance between genetic improvement and preservation of genetic diversity. The aim of the study was to apply optimal contribution selection algorithms on Landrace and Large White pigs in Croatian national breeding programme. The data set contained around 134K litter records for Large White, Landrace, and their crosses and around 52K animals in pedigree. Optimisation algorithms were applied in two scenarios: the first scenario was based on the maximisation of genetic gain and restricting the mean kinship in the offspring accounting also for breeding values. The second scenario was based on minimising inbreeding by restricting the average kinship. In the first scenario, different kinship constraints between candidates resulted in changing the number of selected animals and changed average breeding values, so that the number of selected candidates increased when the kinship constraint was stronger, with a simultaneous decrease in breeding values. The second scenario resulted in increased inbreeding when the additional weight on genetic gain was added. The use of optimal contribution selection in the pig breeding programme in Croatia is possible with additional efforts to improve pedigree and data quality.

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