

Abstract of Jakub Borkowski doctoral dissertation entitled:

“Research on producing a paternal line from an active population of Polish Large White pigs”

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Date of abstract preparation: 07.06.2023.

Dissertation was done at the National Research Institute of Animal Production.

The maternal breed of the Polish Large White (PLW) almost matches in breeding performance the best herds of the second maternal breed, the Polish White Lop-eared, but it is definitely more differentiated in terms of meatiness, weight gains and feed conversion rate. By subjecting the data from the evaluation of fattening and slaughter performance to a detailed analysis, attention was drawn to the great potential of the PLW breed, very often not differing from the results of breeds traditionally recognized in Poland as sire breeds. The domestic market is clearly looking forward to the possibility of using in the production of high-quality pork the fattening pigs derived from crossing with white boars, traditionally preferred by Polish producers. It is therefore advisable to develop the assumptions of the breeding programme and begin work to allow the separation of a new line – this time paternal – in the Polish Large White breed. As part of this line, a terminal boar will be produced, actually corresponding to the modern, ever-increasing expectations of producers.

The scientific goal of the research is to develop threshold values to achieve the breeding progress assumed for the new sire line separated from the active population of the Polish Large White breed of pigs. The utilitarian goal will be to construct guidelines for developing a new breeding programme for a new sire line separated from the population of Polish Large White pigs.

The material for the study included data collected in the POLSUS-TRZODA OTDane system belonging to the Polish Association of Pig Breeders and Producers

POLSUS. The dataset contained phenotypic, pedigree and chronological information on 57,333 young boars and 255,560 gilts of the Polish Large White breed, subjected to routine performance testing of fattening and slaughter traits. This evaluation was performed in the period from October 1, 2004 to the end of 2018, in accordance with the current methodology. The data were verified and thoroughly characterized by estimating means, standard deviations and coefficients of variation for traits included in the live evaluation of PLW pigs, by sex and years of birth of the animals. Then, within each sex, phenotypic trends were estimated and the sizes of the half-sibling groups and the sizes of the herd-year-farrowing season (HYS) subclasses were calculated and their distributions were drawn up. Genetic and phenotypic parameters of traits from live evaluation were then estimated and breeding values of animals were estimated based on them. The realized breeding progress in the performance test traits and the expected breeding progress based on the proposed new selection indices were analysed.

It was found from the research that the Polish Large White breed is characterized by steadily increasing parameters of fattening and slaughter traits. The level of these traits will soon fit into the assumptions of breeding programmes appropriate for breeds of the paternal component. The magnitude of the estimated coefficients of heritability and genetic correlations for this population indicates the possibility of using the analysed traits from the live evaluation to further improve the breed to increase daily gains and carcass meat percentage. Based on the analysis of genetic trends, it was found that the realized genetic progress was faster in boars than in gilts. In both sexes, the fastest realized genetic progress was estimated for daily gain, while the lowest was estimated for measurements of backfat thickness taken at points P2 and P4. It was also shown that the fastest expected breeding progress would be provided by selection indices considering two traits: daily gain and carcass meat percentage, with a different combination of economic weights for each sex. It was also found that in the analysed population of the PLW breed there is a sufficient number of animals with breeding values higher than the population average. The selection of these animals, based on the developed selection indices, as parents of the next generation of the newly created Large White paternal line will ensure the effective realization of breeding progress in this line.