

**The doctoral thesis of MSc. Piotr Polok entitled: " The utilization of various indexes in terms of the fattening and slaughter traits for pigs breeding progress optimization" written under the supervision of Dr. Grzegorz Żak - Summary**

The main goal of the swine breeding is to generate the progress of economically important production traits. Through distribution of improved breeding material - of boars and gilts to mass production, the results of breeding work are implemented in practice.

Modern and reasonably conducted pigs breeding requires the development of appropriate methods, adopted to the implemented foundations of breeding program, and thus the market needs. Developed methods, based on which the selection of pigs in active population is carried out, have been focused on the improvement of traits important for an economic point of view. To achieve breeding goals farmers want to improve daily mass gain and the meat percentage in the carcass. These traits are used as components of selection index, whose value decides on the selection of animals for further breeding.

In various countries the selection indexes were developed depending on the implemented programs and breeding purposes. Correctly estimated genetic parameters of evaluated pig populations play important role in the process of determining the selection index. Since 1995, the Polish modified methodology of performance test has been applied. In this methodology, the daily gain for fattening trait was standardized for 180<sup>th</sup> day-of the lifespan and the daily gain for slaughter trait was standardized as a percentage of meat in animal body. Both traits were included in the selection index and routinely evaluated. Afterwards, in 2004 the improvement of performance test method took place and is still valid. The changes in the pork market, which have occurred over the years in Poland, forced the intensification of work on genetic improvement of the pig population. The effects of these activities are reflected in the value of fattening and slaughter traits. The analyzes of fattening and slaughter performance of pigs shows that in terms of above-mentioned traits significant progress was achieved recently. However, maintaining such a trend for extended period of time could lead to getting too high, as for the maternal breeds, level of fattening traits, but most of all slaughter traits.

The Best Linear Unbiased Prediction (BLUP) method has been applied in the selection since 2010. The selection index weights aggregate 40% of the fattening and slaughter performance for maternal breeds. Moreover, the long term selection results in altering of the level of pigs utility. This implies the need to verify the used methods, on which breeding work is carried out.

The aim of this study was to verify the assumptions that have been adopted during the development of the performance test method and selection indexes for maternal breeds. Likewise, to estimate genetic parameters and selection strategies to improve selection. The final goal was to obtain an optimal breeding progress in terms of daily gains and the percentage of meat in the carcass in accordance with the currently implemented breeding program in Poland.

Experimental material consisted of 427 boars of Polish Landrace breed, evaluated between January 2004 and September 2005. The boars and their offspring (6744 males and 31572 females) were chosen for the renovation of breeding flocks. The data for fattening and slaughter traits like:

- daily gain standardized for 180<sup>th</sup> day of the lifespan,
- meat content in carcass standardized for 180<sup>th</sup> day the of lifespan,
- currently valid index of performance test

were collected in the database belonging to the Polish Association of Breeders and Producers of Pig "POLSUS".

Breeding boars were divided into three groups based on the value of: selection index, daily gain and meat content in carcass, both standardized for 180<sup>th</sup> day of the lifespan.

For created groups of boars their offspring were assigned together with the results of the fattening and slaughter assessment and selection indexes.

Based on this data five individual indexes differentiated in terms of validity of the fattening and slaughter traits were developed:

- Index 1: daily gain 90%, meat content in carcass 10%,
- Index 2: daily gain 70%, meat content in carcass 30%,
- Index 3: daily gain 50%, meat content in carcass 50%,
- Index 4: daily gain 30%, meat content in carcass 70%,
- Index 5: daily gain 10%, meat content in carcass 90%.

The comparison method was performed for the level of the fattening and slaughter traits obtained for the breeding boars and their male and female offspring. Moreover, the effect of the daily gain and meat content were analyzed using different criteria for the division and choice of fathers.

The results shown a number of statistical differences in performance of offspring derived from fathers belonging to each of group. Analysis allowed to choose the optimal selection index and to achieve goals of the National Breeding Programme while maintaining level of fattening and slaughter traits in pigs population. The obtained results indicate the

possibility of controlling the level of fattening and slaughter traits by the use of defined selection index. Furthermore, it was shown that there is a need of fattening traits improvement in the population of mother breeds through the use of index, in which the weights of the daily gain and the meat content of the carcass should be equal to 70% and 30%, respectively.

The final conclusion indicates that it is necessary to modify the currently used formulas of the pigs selection index in terms of the fattening and slaughter traits to achieve the assumptions of the National Breeding Programme.