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THE ROLE OF GENETICS IN THE HEALTH PROTECTION OF PIGS ON COMMERCIAL FARMS (RESEARCH REVIEW)

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Introduction:

- A healthy pig is a condition for the production of quality meat. In modern pig production, genetics aims to improve the production capabilities of existing breeds used on commercial farms, as well as the improvement of genetic, and therefore phenotypic, characteristics with greater potential to create a pure breed or to breed pigs even more successfully for commercial purposes.
- The discovery of mutant throats would result in their exclusion from the breeding program. In the majority of pigs whose karyotype was analyzed, we found the appearance of a transformed karyotype, which is characterized by the appearance of aneuploidy, polyploid cells and cells with structural chromosomal aberrations, most often of the monochromatid type
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Conclusion:

Detection of carriers of chromosomal changes would determine their exclusion from the reproduction program. Carriers of hereditary anomalies most often have a balanced altered karyotype, they are heterozygous, so the changes are not observed on the phenotype, and the consequences are manifested only in the offspring in the form of various disorders in production characteristics. The detection of these carriers is particularly important in artificial insemination programs. At a time when artificial insemination is widely used and when a large number of sows can be inseminated with the seeds of one breeding boar, identifying carriers of hidden anomalies is an important task in the selection of a breeding herd.

Karyotype analysis of pigs

The karyotype was analyzed in a total of 66 pigs, of which there were 40 boars, 5 gilts and 21 breeding sows. The pigs came from commercial farms. For karyotype analysis from peripheral blood lymphocytes, the method according to Mooread et.al() was used, a method that was later modified by Evans and O'Riodanova , and then by Zimonjić et.al. A karyotype analysis was performed in 6 boars from the commercial farm "A". We established aneuploid cells in 5 boars, ranging in percentage from 1.8% to 20.0%. Polyploid cells were found in two boars in a percentage of 1.0 to 1.1%. Cells with structural chromosomal aberrations were found in two boars from 1.0 to 8.9%. From the commercial farm "B" a ryotype analysis was performed in a total of 34 nerats.

We found aneuploid cells that ranged from 2.0 to 38.0%. In 29 boars, the percentage of aneuploid cells did not exceed 10%. Polyploid cells were found in 16 boars from 1.0 to 6.0%. Cells with structural chromosomal aberrations were found only in 10 boars, from 1.0 to 7.0%. From the commercial farm "B", a karyotype analysis was performed in 5 gilts. Aneuploid cells were found in a percentage of 8.0% to 18.0%. Polypoid cells were found in 4 gilts, and the percentage ranged from 1.0 to 3.0%. Cells with structural chromosomal aberrations were found in three gilts and their percentage was from 2.0 to 3.0%.

Karyotype analysis was performed on 21 sows at the commercial farm "B". We found aneuploid cells from 3.0 to 18.0%. The relatively high frequency of aneuploidy originates in part from the removal of chromosomes from the metaphase figure during the preparation of cytogenetic preparations. In 13 sows, the percentage of aneuploid cells did not exceed 10%. Polyploid cells were found in 7 sows and the percentage was 1.0%. We found cells with structural chromosomal aberrations in 15 sows, which ranged from 1.0 to 6.0%. Aneuploid cells were observed in all examined animals. The presence of polyploid cells was observed in most of the examined pigs(Bojkovski et.al. 1996,2010,2011)

However, a more frequent occurrence of cells with structural chromosomal aberrations, mainly of the type of monochromatid breaks, as well as the occurrence of balanced translocations, was observed. The appearance of chromatid breaks often occurs as a result of the effect of chemical substances found in the environment. In our analysis, the appearance of chromatid breaks was detected in 10 pregnant and 3 sows. In our research, an increased percentage of aneuploid cells as well as cells with structural chromosomal aberrations was present in older sows.

The appearance of chromatid breaks in older animals is probably the result of disturbances in DNA repair mechanisms, which are known to weaken with aging animals. We consider the detection of animals carrying structural karyotype changes to be significant when it comes to breeding cows. It is especially important when it comes to artificial insemination programs.

The mentioned changes can spread in the population. Our recommendation is to promptly exclude animals with abnormal karyotype changes from reproduction (Bojkovski et.al 1996, Vidović et.al.2010, Petrujkić et.al.2011,).