

## **Results from France on genomic selection in showjumpers**

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What are we doing when we choose a horse to be a stallion or a mare? We compare conformation, gaits, own performances in jumping and performances of relatives as father, half sibs etc... This is exactly the same with breeding values published by official organism but with complete data and rules to weight all this information. And with genomic selection, it is also exactly the same, with only a supplementary tool to improve the knowledge of the breeder on young horses. In France, we built a project in 2009 where we genotyped about 1000 horses. We obtained for these horses the nature and the position of 54'000 bases in DNA. DNA, the support of heredity, is a succession of 4 bases as 4 letters A C T G (also called SNPs). Then, 900 horses with own performance and a lot performances of relatives were used to construct a formula which link genotypes to the performance. It is very simple formula in which we only count the number of SNPs at the same place shared by the best horses. If these SNPs are shared by best horses, they must be linked for all horses to good performances. Then we applied this formula to a group of about 100 horses with genotypes but without any knowledge about performance and performance of relatives. We were able to predict the performance of the horse from this only information, the genotype. So, yes, it works but the accuracy of this prediction is still low. So we built a following project with more horses (2000) and more traits recorded (morphology and gaits). To improve the accuracy, all we need is more genotypes and performances. But it is worth because once this reference population (genotype + performance) is built; it can be applied to any other horses, without performances and without relatives with performances. So for traits difficult to record (as OCD, sperm quality, behavior traits), it is a good way to get accurate prediction. In conclusion to achieve the effectiveness of genomic selection, we must put our international effort together for a better knowledge for everyone. This is not opposite to a fair competition because each stud book remains the master of their own objective and traits they want to improve.