



# Genetic characterization of Czech and Slovak Warmblood using panel of 17 microsatellite markers

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## Introduction

In general warmblooded horses are halfbloods, or hybrids, which originated out of various domestic breeds and were ennobled with the blood of English purebreds and Arabians.

Slovak Warmblood and Czech Warmblood have a lot of similarities, analogous genetics of conformation, locomotion and physiological traits.

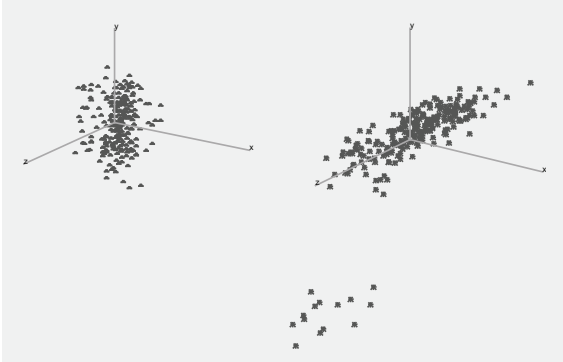
## Material and Methods

The hair, blood and sperm samples were collected from 234 unrelated individuals each of Czech and Slovak Warmblood of Czech origin.

The genotyping of microsatellite markers was performed on ABI PRISM 310 Genetic Analyzer (Applied Biosystem) by fluorescent fragment analysis and detected by software GeneScan® 3.7 NT. Alleles were assigned by GENOTYPER.

We analyzed genetic distance and diversity between them on the base of the dataset of highly polymorphic set of microsatellites representing all autozones using set of PowerMarker v3.28 analysis tools and three machine learning algorithms /IB1, k-means clustering and Naive Bayes classifier/ for results comparison.

This figure shows a graphical representation of reduced (3 main principal components) data space of 17 microsatellite markers for both of analysed breeds, the first one represents the Czech Warmblood, the second one represents the Slovak Warmblood.



The legend for summary figures where each colour represents data value (range of numbers).

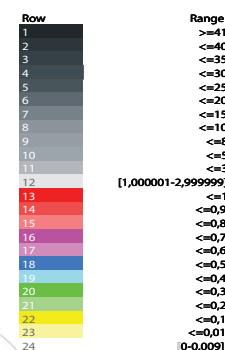


Table shows the obtained precision of classifications models built by Weka framework to classify the individuals by the breeds. The precision of classification is assumed as ratio of genetic difference between breeds. So, we can discriminate this two breeds by using our models based on 17 microsatellite loci with presented precisions.

	ZeroR	IB1	J48	NaiveBayes	BayesNet
Precision	49.145	62.820	57.265	69.444	70.086

## Results and Conclusion

Genotype data of 234 animals in each breed from 17 microsatellites loci (AHT4, AHT5, ASB2, HMS3, HMS6, HMS7, HTG4, HTG10, VHL20, HTG6, HMS2, HTG7, ASB17, ASB23, CA425, HMS1, LEX3) were used to evaluate the genetic diversity between Czech and Slovak Warmblood.

Small effort for breeding has been exerted in Slovak Warmblood and a possible reason for a high level of genetic diversity based on individuals genotype analysis in this population as compared with Czech Warmblood.

These two populations show genetic relations, but they are evidently distinct from each other.

Figure 1. Summary graph for Czech Warmblood.

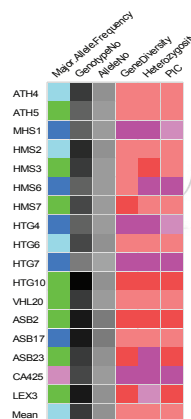


Figure 2. Summary graph for Slovak Warmblood.

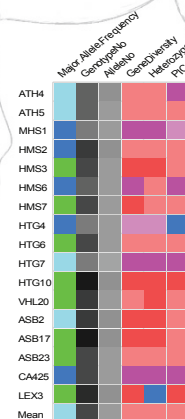
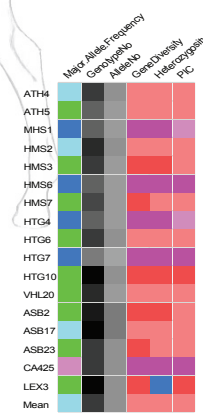


Figure 3. Summary graph for both breeds.



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