



# Genetic profile of Sztumski and Sokolski cold blooded horse in Poland

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The cold blooded horses in Poland has been developed in the beginning of XX century, from oldest Polish native horse descend from Tarpan and imported stallions. The main breeds used include: Ardennes, Belgian and Breton, and less used breeds, North Swedish, Russian, Døle, Mur Island, as well as single documented cases of Fjord and Canadian, Boulonnais and Jutland stallions.

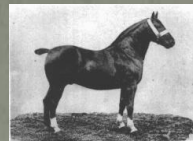


Fig. 1 Sire lines descended from foreign stallions

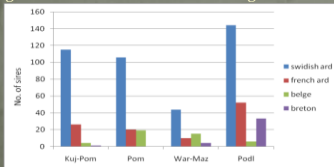
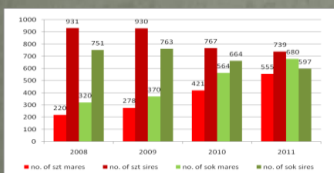


Fig. 2. Number of Sokolski and Sztumski mares and stallions in conservation programmes



From 2008 the genetics recourses conservation program permit to conduct the monitoring of two last, local populations: Sztumski and Sokolski. During the four years of the programme implementation, the number of mares in the programme increased from 320 in 134 herds, to 680 and 229 herds, for the Sokolski breed; and for the Sztumski breed from 220 mares (83 herds) to 555 (147 herds).

Although increase of populations is very difficult to find hors with "pure" pedigree. Actually the herds are spread in whole territory of Poland: Sokolski occur in 8 provinces, Sztumski in 10 provinces. The environmental condition (soil, temperatures and feed availability) are various and in a long time, could influence the phenotype changes of breeds.



Table 1. Genetic distance ( $D_R$ ) microsatellite loci for the Sokolski, Sztumski, Ardennes and Polish Heavy Horse

locus	Ardennes Polish Heavy	Sokolski Polish Heavy	Sokolski Ardennes	Sztumski Polish Heavy	Sztumski Ardennes	Sztumskie Sokolski
VHL20	0,146	0,031	0,107	0,052	0,116	0,039
HTG4	0,055	0,003	0,070	0,011	0,021	0,020
AHT4	0,031	0,021	0,035	0,073	0,091	0,053
HMS7	0,019	0,037	0,023	0,007	0,006	0,022
HTG6	0,004	0,001	0,005	0,000	0,003	0,001
HTG7	0,021	0,026	0,026	0,021	0,037	0,015
HMS3	0,071	0,024	0,106	0,012	0,094	0,040
HMS2	0,059	0,011	0,101	0,018	0,051	0,033
HTG10	0,089	0,033	0,182	0,033	0,045	0,112
HMS6	0,020	0,015	0,005	0,041	0,042	0,029
ASB2	0,025	0,007	0,048	0,014	0,059	0,021
$\bar{x}$	0,043	0,018	0,055	0,022	0,045	0,030

The analysis, conduct in two laboratory permit to establish the genetic variability between Sztumski and Sokolski cold blooded horse and between Polish Cold Blood and protected population (Sztumski, Sokolski), between Ardennes who is the factor of all Polish cold blooded horses and another three. Was tested genetic markers of 2<sup>nd</sup> class: 11 microsatellites of Sztumski, Sokolski, Polish Cold Blooded and Ardennes.

Two smallest distance for the pair Sokolski-Polish Havy Horse and Sztumski-Polish Heavy Horse and largest for pair Sokolski-Ardennes, that the expected differentiation between Polish and foreign breeds. Nevertheless the results confirm suggestion of excessive number Sztumski and Sokolski stallions derivate from not native region of Poland.

## Conclusions:

1. There is low variation between the populations of Sztumski and Sokolski horses and high variation within a each breed, which has resulted from the use of a large number of stallions of different breeds in the past.
2. Actually the excessive number of stallions used for breeding of both types slows or prevents breed development, and delays the process of type restoration and consolidation.
3. It can be assumed that the spread of the population of both breeds across Poland will lengthen the process of type restoration because of the varied environmental impacts in different regions.

