



SNP parentage testing
experiences from KWPN

Daniëlle Arts MSc, WBFSH seminar December 7th 2021

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History KWPN parentage testing

Before 2018 (all STR testing)

- Mandatory sire and dam testing for;
 - Approved stallions
 - Foals not identified and microchipped in presence of their biological dam (e.g. ET / ICSI foals, weaned foals etc.)
 - Horses with special issues (e.g. late registrations, wrong color matches, 2 covering dates within one heat with 2 different stallions etc.)
 - Samples of studbook mares during gradings
- Voluntary testing;
 - Breeders initiative



History KWPN parentage testing



Since 2018;

- Mandatory parentage testing for all new registered horses
 - Sire only
 - For horses identified and microchipped in presence of their biological dam
 - Sire and Dam
 - All other situations (including ET / ICSI foals)
- Voluntary testing;
 - Breeders initiative

From STR to SNP testing → Why?



Since 2016;

- KWPN has introduced genomic selection in their breeding program
- A lot of horses were SNP genotyped for this occasion
- Members didn't understand why parentage check and genomic selection are two different types of analysis (STR vs SNP)
- Looking for a method where we could serve both ways with one technique and one analysis only.
- Logical step to make the move to SNP already

From STR to SNP testing → How?

- Together with our lab Neogen/ Geneseek in Scotland we developed a SNP warmblood panel
- Warmblood parentage panel consists of;
 - Known SNPs of ISAG core panel, but also present at Geneseek's high density SNP chip (GGP) (at that time)
 - Supplemented with carefully selected SNP's suited for parentage check, also available at high density chip; to gain more power of exclusion
- But.....time flies and development also! → nowadays;
 - The GGP equine chip has been developed further and comprises all ISAG SNPs which are under investigation.
 - KWPN genotypes all foals and horses on this high density chip and extracts from this the needed (international) core panel for pedigree testing



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SNP testing → Procedure

- * Criteria on callrate sample
- * Duplicate genotypes on same horse
- * Gender check



DNA sample

Neogen for genotyping

Genotypes to KWPN

Genotypes quality checked in genomics pipeline

Parentage check based on opposing homozygotes

Pedigree checked sample

Opposing homozygotes example with 3 SNPs;

	SNP1	SNP2	SNP3
SIRE:	C/T	A/A	G/A
PROGENY:	T/T	G/G	A/A

SNP testing → Pros and cons vs STR



- **Pros**
 - SNP is technique of future
 - Fast and accurate
 - No 'subjective' reading of scores
 - Computer algorithms can do the job
 - In case of pedigree failure → easy search for 'possible parents'
 - High density results also useable, double genotyping not necessary
 - Costs are similar to STR testing, but of course dependent on quantity
- **Cons**
 - Not all sire and dams have SNP genotypes (sometimes difficult to get DNA as well)
 - Need expertise to do actual parentage check if your lab is only genotyping, but almost all labs have this service.
 - ISAG SNP panel not clear yet → needed for international exchange of SNP genotypes (including guidelines how to deal with them)

Thank you for your attention!



KWPN
Royal Dutch Sport Horse

