



**General Assembly in Dresden Tuesday 11, 2022**  
**Annual report 2021/2022 from**  
**Department on Scientific Collaboration**  
**By Karina Christiansen**

**Introduction to the Department of Scientific Collaboration**

To reflect the increasing importance of science and research in sport horse breeding, the Department of Scientific Collaboration was created in 2021. This department aims to strengthen the knowledge exchange among studbook members and the scientific community. More specifically, the main tasks are coordinating scientific research projects and making the latest scientific developments and information available to the members through wbfsh.com, webinars, seminars, and workshops.

**Scientific Advisory Committee (SAC) – new members**

In 2017, the WBFSH formed a committee for “Collaborative Implementation of Genetic Applications in Sport Horse Breeding (CIGA)”. The idea was to set up a platform for scientists and studbook representatives to come together to share their knowledge and experiences and to set up initiatives and projects to support research in and implementation of scientific initiatives and advances to support sport horse breeding. To reflect the broader development of the committee and its activities, which have grown over the years, CIGA was renamed the WBFSH Scientific Advisory Committee (SAC) last year. This committee works closely with the Department of Scientific Collaboration.

The intention of SAC is to serve as a meeting point and inspiration forum and to share information about the advances in new technologies related to evaluating horses and their inheritance. Over the years, CIGA/SAC has taken the lead in preparing seminars and workshops about linear scoring; international breeding value; genomic selection; Fragile Foal Syndrome; transition from microsatellite to SNP markers in parentage testing, etc.

The members of the SAC have recently changed. Unfortunately, more of the SAC members has left their position in the respective studbooks and by this also SAC. We are thankful for their work over the years. Instead, new members has entered SAC to ensure an efficient group of studbook members and scientists with engagement and broad knowledge:

*Studbooks representatives in the SAC:*

Chairman Karina Christiansen (DWB)  
Anja Lüth (ZVCH)  
André Hahn (OLD)  
Arancha Rodrigues (ANCCE)  
Sonja Egan (HSI)

*Scientific representatives in the SAC:*

Kathrin F. Stock (VIT and Representatives of the EAAP Horse Commission)  
Anne Ricard (French National Institute for Agricultural Research)  
Åsa Viklund (The Swedish University of Agricultural Sciences, SLU)



WBFSH

WORLD BREEDING FEDERATION  
FOR SPORT HORSES

## **International Breeding Values (IBV) - update**

At the General Assembly 2019 in France, SAC organized a seminar about International Breeding Values, where experts from the cattle industry informed about the value of having international breeding values, which will also be fundamental for the development of genomic selection for performance. At that seminar, it was decided to start a similar project in the WBFSH.

The WBFSH members share the goal of producing sport horses for at least one of the Olympic disciplines (show jumping, dressage and/or eventing). Bringing all information together from different countries and FEI will give a more complete and reliable picture of the stallion's inheritance than information from just a single country. Only looking at the number of offspring a stallion has on international level, does not give us any information about how large the proportion of the stallion's offspring reaching international level is. Nor does it take into account the quality of the mares the stallion has served. Using International genetic evaluation, including national and international competition data, can solve both problems.

In 2020, SAC developed a questionnaire and sent it to WBFSH studbooks with an already existing national evaluation system to get an overview of parallels and differences between the studbooks. Based on feedback from seven out of nine requested studbooks, SAC worked out a report on the existing genetic evaluation of sport horses. Based on that report, it was recommended to test if the so-called "MACE-system" (multi-trait across country evaluation), which the cattle industry uses, could also be used for horses. A significant advantage of this system is that it is based on the exchange of national breeding values, so no raw data is exchanged. In this way, each studbook can keep its national evaluation system specially designed for their selection system. With an adjusted MACE-system, there will not be one unique list of the best stallions. Instead, each studbook will receive an individual list with the stallions that can give breeding progress to their studbook. Because of the different mare populations, these lists of stallions will also be different.

The challenge is that the MACE-system builds on the principle that an animal has performance in only one country (or studbook). The data structure in riding sport includes results from horses with performance records in more than one country. SAC, therefore, recommended that the first phase of the IBV-project should be to investigate whether and how MACE could be adopted for sport horses. The budget for the IBV-project is estimated to be 240,000 Euros.

As a pilot project, it was decided to focus on jumping because the competition results (height) are easier to compare between countries than dressage results (different tests and levels across countries). To keep it as simple as possible, it was furthermore decided that in the first phase, only Germany (all studbooks), KWPN, and SF should be involved. The studbooks now need to make contracts and find agreements for the exchange of data. The WBFSH-FEI data exchange project is still in progress and not ready for use. When this is ready, the IBV-pilot project can start. KWPN is furthermore in the process of building a data warehouse, which will be able to handle all the data involved in the IBV-project (pedigrees, sports data, etc.).

As the project with International Breeding values is a complex and long-term project, WBFSH plans for a webinar about national breeding values in December 2022. The webinar will be on a



non-scientific level for breeders to understand this tool and how the values are calculated in the different studbooks.

### **European Association for Animal Production - EAAP**

The Department of Scientific Collaboration is in close contact with EAAP, which is also a part of the WBFSH annual plan. EAAP is an international non-governmental organization that aims to improve the knowledge and the dissemination of research results on domestic animal farming. EAAP consists of more commissions, one of them being the Horse Commission. The Horse Commission plans the different scientific sessions presented at the annual EAAP meeting, many related to horse breeding.

The EAAP Horse Commission (EAAP-HC) can provide the WBFSH member studbooks with many opportunities. The EAAP-HC can not only take up and promote topics of significant practical importance for the annual scientific meetings but also bring into touch studbooks and equine scientists from different fields to address specific questions.

A summary from the annual conferences of the EAAP has become an integral part of the WBFSH General Assembly, presented by the EAAP-HC representative Kathrin F. Stock. Those summaries help the studbooks update regarding animal science development with a particular focus on horse breeding.

### **The transition from microsatellite to SNP markers in parentage testing - webinar**

On December 7th, 2021, SAC organized a webinar titled “How to bring genomic development to horse breeding.” The webinar was an open exchange of considerations and first practical experiences with transitioning from microsatellite to SNP markers in parentage testing. The number one criterion for a successful breeding program is to know the identities and the pedigrees of the horses included. Today, most studbooks use microsatellites for parentage testing. However, the usability of microsatellites is for nothing other than parentage testing.

Genomic selection is based on SNP technology. SNP genotyping has become an affordable standard service in many larger molecular genetic laboratories and is used for both genomic selection and parentage testing. But the transition from microsatellite to SNP markers will require some effort as the two systems cannot be compared directly.

The Netherlands, France, and Germany explained their different transition strategies at the webinar. The Netherlands has chosen a direct transition to SNP genotyping of all newly and earlier sampled horses. This method is relatively expensive as the older horses have already been tested by microsatellites and need testing again by SNP. But with this procedure, KWPN is ahead of the ISAG (International Society for Animal Genetics), where the focus is still on using microsatellites for parentage testing. SNP-based parentage testing has become standard in other species but not yet in the horses because of essential considerations to the whole system (molecular genetic laboratories; databases/data service providers; computation centers; studbooks; national and international data use and exchange etc.).



Instead of a direct transition, France and Germany have independently developed imputing routines. It requires thousands of horses with both microsatellite and SNP genotype data for setting up and training the imputation algorithm. The concern of this approach is the question of accuracy getting high enough. Thanks to a strong data training set from sport horse breeds with high consistency of SNP data, the German imputation system has already been implemented in routine. The French imputation system has not yet been practically implemented due to the many different breeds included in the French imputation system.

The webinar was recorded and is online on [wbfsch.com](http://wbfsch.com), together with a summary. You can also find a fact sheet on parentage testing on the website.

### **Linear profiling - information**

With Kathrin F. Stock as the driving force, there have been annual international workshops for linear profiling in warmblood horses for many years. These workshops have been open to all WBFSH members, and they are beneficial for studbooks that want to start using this tool. On [www.equinephenotypes.org](http://www.equinephenotypes.org) there is access to an overview of all linear trait descriptions used in the different studbooks and information from earlier workshops.

In connection with the General Assembly in Dresden 2022, the host DSP (Southern German Breeding Association) has planned a seminar with an introduction to linear profiling in theory and practice. Through this, studbooks that have not yet implemented the system can see how it works. Other studbooks that have already implemented linear profiling can see how it is done in DSP, as each studbook has to develop its own system according to their breeding goal.

### **Information about research in your country**

The Department of Scientific Collaboration will be happy to receive information about any ongoing research in your country/studbook. Please send a small summary of the research to [secretariat@wbfsch.com](mailto:secretariat@wbfsch.com), which can then be published on the website. Other information in the form of scientific papers will also be more than welcome.

If a WBFSH member studbook needs support to implement linear profiling, breeding evaluation, or genomic selection, SAC can connect them with an expert who can advise. Do not hesitate to contact the Department of Scientific Collaboration.