



Rewarding exchange of experiences and knowledge at the 5th International Workshop on Linear Profiling in Flyinge, Sweden

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On January 22-23, 2019, the Swedish Warmblood Association and Flyinge Equestrian Centre hosted a two-day workshop on linear profiling. This was the 5th international meeting on linear profiling, an event series initiated by the Horse Commission of the European Federation of Animal Science and its Interstallion working group. This year's focus was on the practical linear profiling of young horses and horses under rider. More than 50 participants from 16 countries gathered for this event at Flyinge. Once more, the International Workshop on Linear Profiling in the Warmblood Horse (IWSLP) succeeded in bringing together practice and science: Judges and representatives of various European breed associations met with a few researchers active within the field. The first day was filled with practical exercises and discussions regarding what traits are linearly described and how in the different studbooks. The theoretical part provided further insight into current routines of linear profiling and ongoing research. This report will summarize the major points of the inspiring workshop.

In the practical part, the experienced SWB judges Christina Olsson, Mikael Nolin and Jan-Ove Olsson served as guides and helped maximizing the output of the exercises. Questions addressing particular traits showed similarities and differences in the studbooks' views of the same traits and underlined challenges of appropriate interpretation of linear data. For example, when profiling conformation it became clear that a 'long' horse can mean different things in different countries, according to the mean or most common expression of body length. To allow direct comparisons between currently used linear schemes, evaluation sheets had been distributed to all participants.



Mikael Nolin, SWB main judge for jumping, is explaining how linear profiling of young horses is routinely performed in Sweden (left picture). Christina Olsson, SWB judge for dressage and conformation, is commenting on certain traits and collecting feedback from the participants (right picture). Pictures: E.-M. Broomer, Horse Power Creative



In the discussion it became clear that the way of how linear data are collected is crucial for the detailedness of the standardized descriptions. The Oldenburg studbooks have implemented routine linear profiling with the largest number of traits, and electronic documentation is mandatory for reasonable handling of the approximately 200 traits. Accessibility of data on specific aspects of potential relevance like carriage of the tail (straight - skewed) and tail tone (untoned - overtuned) was discussed in this context. The German representatives suspect that there may be a relationship between how a horse carries its tail on the one hand and the power that comes from its hind legs and its overall coordination on the other. The prevailing view is that large horses with big movement and mobility may be more likely to exhibit limp tails or tails that are not carried straight behind. The same goes for horses with a spectacular yet sometimes unbalanced jumping technique. However, this view was contradicted by data indicating, that several high-ranking jumping and dressage sires in German breeding seem to pass on some disposition for 'limp tails' to their progeny. The participants all agreed that the topic was of interest and requires more research. Questions from participants addressed why the Oldenburg studbooks have included several traits regarding the horse's head, such as the size of the eye, eye color and ear length, in their linear scheme. Inge Workel, Associate Breeding Director of the Oldenburg studbooks, made the audience laugh when commenting on the role of an aesthetically attractive appearance of a horse, although there is consensus that it has nothing to do with performance: Nice-looking horses are easier to sell.



*The Flyinge Equestrian Centre and its team contributed to the successful course of the practical sessions - with excellent organization, great facilities, horses, and several helpers on the ground and in the saddle.
Pictures: E.-M. Broomer, Horse Power Creative*





An important question for the sport horse breeder is how linear data can be linked to performance in competition. However, large amounts of linear data are needed to properly investigate this. KWPN linear data had been used as study basis in 1995. When focusing later on the relationships between conformational aspects and durability, indications were found that uneven feet (asymmetrical hooves in the front limbs) tend to shorten the sports career of a jumping horse. Everybody agreed that the now increased amounts of linear data being or becoming available should be used for such correlation studies of great relevance for the sport horse.

The discussion that followed centered on the importance of describing horses of the same population from a single perspective of utmost neutrality rather than through the lens of describing 'the dressage horse' or 'the jumping horse'. More research is needed regarding the possible correlations between the profiled traits and performance in different types of competition.

Participants also discussed the importance of using linear schemes which allow to meet future needs. Kerstin André, renowned dressage trainer in Sweden, suggested that traits related to acceptance of the bit are important considering new international rules on tightening of the nose band. Some breeding associations have started linear profiling at young horse competitions in addition to performance tests and breeding assessments of young horses. This results in more horses being profiled and hence a better foundation for monitoring the ability of sires to transmit certain traits. First experiences indicate difficulties in creating meaningful linear profiles from show jumping competitions due to the short time available for linear description.



The participants used the short breaks between presentations to exchange personal views and experiences (left picture). Emma Thorén Hellsten, SWB breeding manager, reported on available applications for linear data and recent developments in Sweden (right picture). Pictures: E.-M. Broomer, Horse Power Creative

The lively discussions about practical issues relating to linear profiling were continued on the second day of the workshop. According to the interesting program with nine speakers from six countries, the focus shifted to more theoretical aspects and the question how to translate findings from research to the daily work of the studbooks. Reports from Belgium (BWP), Sweden (SWB), Great Britain (British Breeding), Germany (Oldenburg studbooks), Switzerland (Franches-Montagnes) and Spain (PRE) gave insights into current developments in linear profiling along with the challenges and possibilities with the system. Linear profiling is today used in several breed associations for both conformation and



performance traits in several age categories and in both genders. Presenting foals is popular in some studbooks, and breeders very much appreciate receiving a linear profile of their horse. On the other hand, overall participation in young horse testing is declining. The potential of linear description of foals was seen as very important by the participants and suggested as suitable focus topic of the next international meeting.

Switzerland presented work regarding the domestic breed Franches-Montagnes, one of the first horse populations that used linear profiling. The current focus of research in this breed is to determine the potential of increased use of technology in order to get hold of more objective data and make progress on closing the gap between such measurements and evaluations by judges. Spain has already rich research experience in this field and is performing similar work focusing on the correlations between conformation traits and desired performance traits. In addition to linear description of conformation and performance, British Breeding has implemented a program, in which veterinarians are also contributing information. Their evaluations refer to correctness of limb conformation and movement, but also muscular development, symmetry of shoulder and pelvis, and foot balance. In order to face today's challenge of attracting more participants, British Breeding is committed to providing 'more value for the money'. Horse owners do not only receive a detailed linear profile, but also an interpretation guide following the traffic light system. Colors indicate how much the horse presented for dressage, show jumping or eventing fits to suggested discipline specific breed optima. In addition, horse owners also receive a video of the evaluation as well as the option to receive feed recommendations from a feed professional present throughout the evaluation.

From the reports on routine linear profiling and subsequent discussions it became clear that the studbooks share the same challenges. Critical points are always the repeatability of linear profiling and the variability between evaluators. Harmonization is very important and must be ensured by proper education and regular training, with the aim to minimize the subjective component of the assessments and make best use of the linear system. For a number of studbooks, time constraints are challenging, too. Detailed linear profiles are difficult to compile in events with large numbers of participating horses and accordingly only short time per horse.

The potential for using linear description in breeding evaluation is substantial. Objective information from linear profiling can provide a useful complement to the traditional valuating scoring relative to breeding goals. According to Emma Thorén Hellsten, Breeding Director at SWB, the heritability of total scores increased since linear profiling was initiated by SWB. This suggests that linear profiling offers judges a very good tool for evaluating horses.

The linear profiles are used today in a few breed associations as basis for descriptive breeding values. A future possibility with these descriptive breeding values could be to offer test mating functionalities. Expected traits in a potential future offspring could then be tested in a specific dam and sire combination on a more detailed level.



Breeding of sport horses involves considerable exchange and use of top performance genetics across countries. It is therefore highly important to know how to interpret evaluations from other countries. To elucidate the comparability of linear profiling across studbooks, researchers from Sweden and Germany have performed a correlation study based on breeding values from separate genetic evaluations. Their findings indicated favorable genetic correlations between corresponding traits in SWB and Oldenburg (OL, OS). This is an indication that linear profiling could serve as a proper foundation for future genomic selection where international collaboration is needed.

After the two days dedicated to linear profiling, representatives from both the practical and the theoretical side agreed that the workshop had created greater insight, better understanding and a more comprehensive view of the whole process of linear profiling and how other associations are working with it. From a judge's point of view, it became more transparent how scientists address linear description and how their evaluations will be used. Furthermore, they got a feeling of their important role. The attending researchers appreciated the insight into how judges view separate traits, which is valuable knowledge when the linear information is analyzed to derive heritabilities and correlations for different traits. Participants agreed that linear profiling is a useful tool for both the breeders and the breed associations. They also shared a desire for more international collaboration and continued engagement for exchange and joint progress in this field.

Linear Profiling Facts

A linear profile is, as the word suggests, a description of the horse and not an evaluation. It is composed of different numbers of linear traits relating to conformation and performance. The description of every trait is in some studbooks, for example in SWB and KWPN, on a nine-level scale for adult horses, from A to I, where A and I are the two extremes and E represents the midpoint. Other studbooks, for example the Oldenburg studbooks, use a seven-level scale from -3 to +3, where 0 represents the midpoint. Linear profiling is generally performed in comparison with the average or most common expression for the breed. However, certain traits such as direction or stance of the toes ('toed out' vs. 'toed-in') are compared with the biological extremes. So, a horse with its hooves pointing straight to the front will receive the midpoint value, i.e. E or 0, respectively.

The purpose of the linear profile is for both horse owners and studbook to receive more detailed information about important traits in a more standardized way. It is easier to follow the development of traits within the breed and to identify individual horses' strengths and weaknesses than with the traditional valuating scoring. The purpose is also to give mare owners 'consumer information' on how mares and stallions pass along their traits and their expected heredity.

More information on linear profiling and how it is performed in different studbooks as well as all conference material is found online at:

http://www.equinephenotypes.org/Texte/recording_ENG.html