EFTBA Veterinary Newsletter 23

Policy and Practice of DNA-Performance Profiling

April 2017

. Performance Profiling has been a subject of interest for the EFTBA from beginning

. A meeting in Paris in 2012 made clear that its development needs a policy and guidelines

. The recent ITBF-congress in Cape Town did approve the EFTBA proposals for a policy on Equine Genomics

Welcome to EFTBA's veterinary newsletter

Dear EFTBA Members,

I am pleased to introduce for the last time after three years of EFTBA presidency the long awaited newsletter and thank all people who have been involved to support us during this period of time.

2017 started very well as veterinary matters were concerned at the ITBF meeting held in Cape Town last January.

Speakers on genomics, horse welfare, breeding and racing from all over the world were very knowledgeable experts. We were all concerned with the same issues with the same needs to communicate between us.

As a result, the conclusion of that meeting, Des Leadon demonstrated that we all have to speak to the bodies of our industry, laboratories and pharmaceutical companies with the same voice in order to get things accomplished.

Links between IFHA, FEI, OIE, EMHF have never been so critical as of now. Focusing on «communication» is the main word .

In the next months to come, I wish you all excellent results for your breeding commitments whether in racing or in the sales ring.

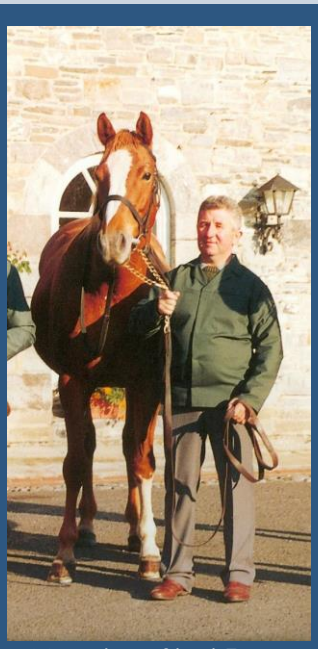
Your devoted chairman

Hubert Honoré

Hubert Honoré

Chairman, EFTBA

"Many thanks to Mrs. Eva-Maria Bucher-Haefner, Moyglare Stud Farm, for her valued sponsorship of this newsletter."



Moyglare Stud Farm
James Feane (Jegen 2005)

Editorial

"Genomics - and genomics again" were the words of Hubert Honoré in the welcome address of our last newsletter and here we discuss this subject once more (!). However, it's not its technology which will be dealt with this time, now we much more want to occupy ourselves with its utilisation for the best advantage of the Thoroughbred.

It is a lot of information again, but please just consider that the veterinary advisory committee, the genomics monitoring group and many more representatives already invested a lot of work into this subject. But all this work wouldn't mean much when the active breeders wouldn't have access to the recent achievements in this field.

To inform about all the relevant and basic issues of breeding is the real and most essential purpose of our newsletter.

Dr Hanspeter Meier

EFTBA veterinary advisor & Newsletter editor

Introduction

Already in the autumn of 2012, there was a "Policy and Best Practice Roundtable on DNA Performance Profiling" held in Paris. Representatives of the International Thoroughbred Breeders' Federation (ITBF), the EFTBA together with members of the Technical Advisory Committee of the International Federation of Horseracing Authorities, the International Studbook Committee, the Asian Racing Conference and invited commercial providers of DNA performance profiling services and Universities gathered to discuss horse industry policy and best practice by providers. The extensive discussions resulted in items as for instance whether the Thoroughbred industry needed a policy in regard to these developments, to safeguarding the industry, to protection from inadvertent selection for inherited defects and the establishment of best practice guidelines.

This meeting made clear that a lot of work in many fields of breeding and racing had to be expected. It was also clear from beginning that the international pattern of racing will influence the type of horse desired.

The EFTBA, different members and other organizations took up the gauntlet and many specific, useful and intelligible articles were published (Crowhurst 2012; Caulfield 2015; Richmond Watson 2015, 2016a, b, c & d, 2017; Rogers 2015; Lamb 2016; McGrath 2016; Morris 2016). Moreover, different meetings had Genomics on their agenda, e.g. the conferences of the ITBF 2015 in Ireland and 2017 in South Africa. The congress in Cape Town from the 6th to the 12th January included a special session on Genomics and its report are the contents of this issue of our veterinary newsletter.

Informations from the ITBF Congress 2017 in Cape Town

(Veterinary Advisory Committee Report)

The Afternoon Session on Day 1 of the ITBF Veterinary Meetings was devoted to **Equine Genomics**. The Chair commenced by reminding delegates of the long standing interest in and active management of the advent of this new technology that the ITBF and EFTBA had taken on behalf of the industry, including the meeting of the ITBF/EFTBA/ IFHA/EMHF in Paris in 2012, the subsequent statements, the rejection of retrospective access to DNA stores held by pedigree registration authorities, the insistence that speed gene test results should not appear in sales catalogues and the formation of the Equine Genomics Advisory Group.

Professor Max Rothschild, a member of the Genomics Advisory Group advised the meeting that he had conducted a telephone survey of four of the commercial genomics companies that are currently selling their test to the thoroughbred industry. Their responses ranged from helpful to reticent. He felt that there was not a sufficient number of horses in their datasets to support the levels of prediction that is offered for the Speed Gene test. He believed that these tests could be valid for large groups but could be misleading for the individual and that the same was true for the so called Performance Tests which rank ability on a scale with four gradations.

He saw a value in the use by the industry of Estimated Breeding Values (EBV) in the future.

Professor Rothschild also reiterated a real industry concern that ownership of the DNA remains a real issue and that precise definition of the racehorse phenotype is a great problem in equine racehorse genomics.

Prof. Max Rothschild

Interview with Max Rothschild
(Sporting Post 4th January)

Professor Rothschild is American who grew up in LA, surrounded by three local racetracks in Hollywood Park, Santa Anita and Del Mar. He's been going racing since he was a kid and jokes that even as far back as that, he's never made a cent off horses and while he has an academic interest in genetic mapping and genomics in horses, he has no vested interest or affiliation to any commercial company. What he does have though, is vast experience in the field of gene mapping and genomics in cattle and more particularly in pigs, having designed and developed tools for large-scale commercial producers to select and allow them to purposefully breed for characteristics to accelerate and improve their yields. As matters stand, approximately 90% of all the pork in the USA is produced using tools he and his students have developed.

Max Rothschild is a CF Curtiss Distinguished Professor in Agriculture and Life Science and holds the ME Ensminger Chair in International Animal Agriculture. Rothschild received his B.S. in animal science at the University of California, Davis in 1974 and his M.S. at the University of Wisconsin in animal science in 1975. In 1978 he obtained his PhD in animal breeding from Cornell University. From 1978 to 1980 he was an assistant professor at the University of Maryland where taught animal breeding and did research into genetics of dairy cattle. In 1980 he joined the Department of Animal Science at the Iowa State University. From 1993 to 2013 Rothschild has served as the USDA Pig Genome Mapping Coordinator and his research dealt with development of genetic tests for improved livestock production.

While the field of genomics and genetic mapping is fairly advanced in the poultry, cattle and swine industries, it has been slower to get off the ground in the equine field, although they are starting to catch up.

Along with the development of the science, a number of commercial ventures have grown up alongside it, to provide the technology to the Thoroughbred racing and breeding industries in particular and these developments and their possibilities and limitations are the subjects of Professor Rothschild's presentation, which will cover an update on "speed" genetics and genomics – test and reliability; 'Racing performance" studies and Speed Genome-wide Association Studies (GWAS) results in the past two years.

With his strong research experience, albeit from the pig industry, Professor Rothschild is uniquely and independently positioned to review and evaluate the various technologies and products that are currently available and explain their application, benefits, drawbacks and limitations. In layman's terms, he's here to discuss what they can and can't do for you.

Dr Rothschild explains, "We have genomics projects here in the US. I was in charge of the pig genome project and a colleague was in charge of the horse one. Because I've been going to the track for a long time, I had an interest, so just kind of listened and kept up with what was going on in the equine project. I was approached about serving on this a genetics advisory board, so I have been trying, in an unbiased way, to determine and describe what tools are available and how these differ – or don't – from methods breeders have been using for years."

"I think the biggest negative is that the research and technology is still relatively in its infancy, although there has been a big improvement in the last year and a half that I've been examining what the companies have to offer. Perhaps the biggest issue is trying to collect and evaluate the results objectively since what the companies do is not transparent."

"To give you an example of how it works in practice, in the USA, about 98% of pigs are derived from commercial companies. These companies are each organized around a nucleus herd where the primary animals are selected. Those genetics are multiplied in the multiplication herds. The commercial pig is made by selecting and crossing animals from the multiplication phase. By concentrating the primary genetics in the nucleus herds, one can make all the decisions there, before filtering the primary genetics out."

"That's what happens in horse breeding, breeders do select for certain traits and are often successful and the companies claim to offer genetic tests that will improve the odds."

"In breeding performance horses, the selection criteria may be different and slightly more complex than in animals where you are selecting for a smaller range of criteria, but the science and the application remain the same. **Although the primary focus might be performance, aspects that may become of more importance in time to come will be soundness and** (of particular interest to the South African audience) **disease resistance**."

"I know most breeders are interested in how this can affect their business model, but the focus of my presentation will be to discuss what's available, the pluses and minuses, to try and take all the hype out of it and put it in real terms so that people have a better understanding of what it is and what it does and make informed choices."

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Dr Brandon Velie then gave a presentation in inheritance of adverse traits dividing them into two distinct categories; simple and complex traits and gave an example of each category viz; hydrocephaly (simple) and so called "Bleeding" / Exercise Induced Pulmonary Haemorrhage / EIPH (complex). Success or failure in determining the genetic contribution of both types of trait can be dependent on the frequency with which the disease entity occurs in the population. He advised that industry, rather than commercial companies, can drive projects aimed at better understanding and cited the Standardbred industry's project on Dynamic Airway Collapse – which is a severe performance limiting problem in that industry (Strand and Skjerve, 2012).

Dr. Brandon Velie

Dr Velie is a post-doctoral researcher working in the molecular genetics and bioinformatics section of the Animal Breeding & Genetics Department at the Swedish University of Agricultural Sciences. After receiving a B.A. in Animal Science (2005) and an M.S. in Animal Breeding & Genetics (2007) from North Carolina State University, he relocated to Sydney, Australia where he completed his PhD in Equine Genetics (2014). His research interests include both the genetics and behavior of horses with a particular focus on the genes underlying complex performance and disease traits in horse racing breeds.

Discussion and consideration in Cape Town

After extensive discussion on both genomics presentations the Chair offered the (following) EFTBA Policy on Equine Genomics to the delegates and invited them to consider it line by line and to indicate their assent or otherwise to each of the statements that it contains:

1. *After careful consideration EFTBA have concluded that it sees no value presently in the widespread usage of performance test genomics (speed gene testing).*

2. *It was felt that these tests have significant potential to adversely affect the existing pattern of racing and the practices and valuation system of the breeding industry.*

3. *It is recognised that some individuals may wish to continue to use this test and they are of course free to do so,*

4. *But EFTBA will not host meetings (or use its offices to circulate literature) that would be used to promote use of performance test genomics.*

5. *The commercial companies that market these tests are of course entitled to host their own meetings and anyone, breeder or otherwise, is entitled to attend them.*

6. *EFTBA recognise that the science of Genomics has found application in other livestock industries, but for very different goals / production traits, than those of the thoroughbred industry.*

7. *EFTBA also recognises that Genomics has been shown to be of value in the identification of predisposition to disease and other health related issues.*

8. *EFTBA consider that this science could, in carefully controlled and monitored studies, provide some benefits in this regard to the thoroughbred industry and further consideration will be given to this use of this science, in collaboration with academic institutions.*

Each statement was supported by a clear and considerable majority. The meeting resolved to advise the ITBF accordingly …

… and **the motion was approved** by the ITBF Meeting by a show of hands.

Echoes in the racing press

Michele MacDonald, Racing Post, Jan 8 2017

Genetic research on the agenda as international breeders assemble

Sixty delegates and visitors representing 19 nations voiced resounding opposition to speed gene testing, in accordance with a European Federation of Thoroughbred Breeders' Associations position, during the opening session of the International Thoroughbred Breeders Federation (ITBF) Congress in Cape Town, South Africa, on Sunday.

The informal vote followed a discussion of genomic research and how it might apply to thoroughbred breeding and racing.

Dr Des Leadon, ITBF veterinary chair and Irish Equine Centre clinical consultant, said directors of the 16 ITBF member nations would consider whether to take an official position on issues covered in eight separate questions associated with EFTBA policy regarding genomics submitted to congress attendees.

Leadon noted that genomic companies have sought genetic data acquired during thoroughbred registrations for use in determining which genes provide superior racing performance.

International breeders have voiced concern that development of such data could rapidly alter the traditional approach to breeding "and would have an enormous impact on the market-place," Leadon said.

"The way forward is for the industry to understand the technology and how it should be applied," said Ronan Murphy, managing director of Weatherbys General Stud Book for the UK and Ireland and the member representative for those countries on the International Stud Book Committee.

The first EFTBA position issue submitted to the congress attendees stated that the association "concluded that it sees no value presently in the widespread usage of performance test genomics (speed gene testing)." Fifty attendees agreed with that statement while ten disagreed.

An identical vote was made on the statement that "these tests have significant potential to adversely affect the existing pattern of racing and the practices and valuation system of the breeding industry."

However, other votes acknowledged that genomics has been shown to be of value in the identification of predisposition to disease and other health issues and that consideration should be given to use of the science in collaboration with academic institutions.

Many profit-based companies are interested in thoroughbred performance profiling using DNA, said speaker Dr Max Rothschild, a professor specialising in animal breeding and genetics at Iowa State University in the United States.

In his presentation, Rothschild reviewed pros and cons with some of the products currently available to breeders, many of which clearly "are not the holy grail" for yielding major winners, he said.

Yet genomics, which have been widely used in breeding some livestock species, could help predict sounder horses with better chances of racetrack success, Rothschild said, suggesting that breeders set up advisory groups of geneticists and veterinary specialists as well as obtain funds for research. "You're losing out if you don't jump in soon," Rothschild said of the rapidly emerging field.

Dr Brandon Velie of the department of animal breeding and genetics of the Swedish University of Agricultural Sciences, reviewed how certain equine diseases have been identified to be genetically transmitted. Genetic testing can confirm or rule out some conditions and help determine an individual's chance to develop a disease.

If genomic testing and research can help eliminate the incidence of disease, Velie said breeders and the industry should make the most of the opportunity afforded by the technology.

Conclusions

Is olc an chearc nach scríobann di féin

Once again, a lot of words from you editor – but please be assured that he also respects the saying *"that actions speak louder than words"* – or with the Irish proverb as above "*It is a bad hen that does not scratch for herself*." We therefore conclude with informations on what actions our industry is now trying hard to come to terms and to manage the usage of genomics:

- In regard to soundness and disease resistance, two projects have been offered by the Genomics Advisory Group to the ITBF and EFTBA: Recurrent Laryngeal Neuropathy (RLN, Roaring) and Polydactyly (congenital physical anomaly having supernumerary digits).

- ITBA have already agreed to lend their support to both projects and there will be further discussions on them at EFTBA.

- For the future of breeding, a close cooperation with racing is indispensable and in this respect, the discussions in Paris 2012 already bear fruit also. At the meeting of the European Pattern Committee (Feb. 1), a new strategy to support a strong program for stayers was decided. This long term project wants to incentivize the breeding, owning and training of quality staying horses. This work has been led by representatives from Great Britain, Ireland and France and aims to improve the program with an upgrade of status for staying races, the promotion of increased prize money and by implementing a downgrade moratorium (BloodHorse, 2017).

We really "jump in" (Rothschild) now and will "make the most of the opportunity afforded by the technology" (Velie). – And please be prepared for further newsletters on aspects of genomics.

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