

INTERBULL – How it Began and Some Achievements

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The use of international genetic evaluations of dairy bulls has become a common practice today in almost all major dairy producing countries around the world. At this year's Interbull meeting in Uppsala we can celebrate 10 years of international genetic evaluations. Furthermore, it is 30 years since the first working group started to work on the issues that subsequently led to formation of Interbull, and it is 15 years ago that the Interbull Centre was established. So there are many milestones to celebrate at this occasion! As all these developments build on previous achievements it is of interest to have the history of Interbull and international genetic evaluations documented.

Initiatives by EAAP...

The activities that led to the foundation of Interbull have two origins, one inspired by the European Association for Animal Production (EAAP) and one by the International Dairy Federation (IDF), or more correctly by people representing these organizations. At the EAAP-meeting in Warsaw in 1975 the President of the Genetics Commission at that time, prof. E.P. Cunningham from Ireland, asked a working group of eight young scientists for ideas for standardizing the expression of breeding values of dairy bulls. This issue started to become urgent in light of the increasing international trade of frozen semen, and the needs for comparison of the genetic merit of bulls from different countries. Claude Gaillard from Switzerland got the task to lead the group of scientists intensively discussing dairy cattle breeding and genetic evaluation principles at meetings held in the following year. The lively debating scientists were Jan Dommerholt (Netherlands), Erling Fimland (Norway), Lars Gjøl Christensen (Denmark), Josef Lederer (Germany), Sandy McClintock (UK), Jean-Claude Mocquot (France) and Jan Philipsson (Sweden). It is interesting to note that all of these are still playing important roles in animal breeding, in research or at government or industry level.

...and by IDF formed the basis

The IDF initiative was led by prof. Hans Gravert from Germany, and from an inquiry study among member organizations it became obvious that there was a great need for improved comparisons of bulls across countries, and some proposals were made. The EAAP group presented its findings and proposals at the EAAP meeting in Zürich in 1976. At that occasion an interesting discussion took place between the two groups having somewhat different approaches. Gaillard's group published a report "AI Bull Evaluation Standards for Dairy and Dual Purpose Breeds". Meanwhile prof. Gravert was able to convince IDF to continue the work in 1978 as part of the Production Division activities and its Group A 12. Several of the EAAP scientists were included in this international group with representatives of Canada as well as Oceania.

Semen trade exploded and Friesians were "holsteinized"

At the same time the famous FAO-experiment for comparison of 10 Friesian strains of dairy cattle in Poland started to yield interesting results, showing an unexpectedly large



European Friesian before....



...and after "holsteinization"

superiority of North-American Holstein-Friesians (HF) in production over their European ancestry populations. The New Zealand and Israeli populations also surprised many with high productivity. A wave of importation of HF semen followed, and in a decade or two the Black and White dairy cattle populations around the world had been "holsteinized". The pictures show that the Friesian cattle in Northern Europe went through a dramatic change also morphologically! This industry development emphasized even further the need for improved methods to compare the genetic merit of bulls across countries as was envisaged by the two working groups. Quite naturally, the lead for methodological developments was taken by representatives of countries importing semen, whereas exporters initially were rather passive.

IDF Group A12 – an international discussion forum ...

The working group successfully led by prof. Gravert systematically reviewed the developments in international dairy cattle breeding at annually arranged seminars. As a voluntary secretary of the working group I could notice the steadily increasing attendance and appreciation for the meetings, where both scientists and industry people reported about developments in research and practice. However, the group had no mandate to decide upon any developments to be applied internationally. Also the recommendations resulting of each meeting were too dependent on the attendees of just that meeting. But the debates between internationally leading scientists at that time were interesting!

... and starter of important development work

A concrete result of the working group was development of an approximate procedure for conversion of sire proofs from one country to another and it was published in 1981 as an IDF-paper. An important achievement of IDF Group A12 was to produce a cross-reference lists of bulls used in different countries. Obviously the same bulls got new names and registration numbers when used in different countries. This caused a lot of problems and it was impossible to follow the daughter results of a given bull in different countries. The work by Dr. Schulte-Coerne at prof. Gravert's department in starting to sort out this problem was very helpful for both the industry and the future scientific developments.

Interbull – a committee with three "parents"

In order to get a more structured work for development of international evaluations and communication the three important chairs, E.P. Cunningham of the EAAP, A. Roos of ICRPMA (later called International Committee for Animal Recording (ICAR) and H.O. Gravert of IDF Group A12, decided to form a joint committee in 1983 called Interbull. Each organization was represented with several people in this committee and I continued to serve as secretary, but now with a formal mandate.

Workshops, reviews and conversion formulas

In the following years a number of workshops and seminars were held in order to develop guidelines for the industry. The one held in Prague in 1986 formed the basis for the first Bulletin published by the Interbull committee: "Procedures for International Comparisons of Dairy Sires – Current Practice and Evaluation Methods". The list of reference in this publication demonstrates in an interesting way all juvenile attempts made in different countries to compare bulls across countries. A break-through in that respect was the more or less simultaneously published methods for conversion of proofs from one country to another by Drs. Goddard (Australia) and Wilmink (The Netherlands). After some years conversion formulas were "flooding" around the world, but few were valid to use as each formula was outdated as soon as any country in a pair-wise comparison had changed its method or base for evaluation.

Surveys and guidelines for better understanding

In order to better understand and correctly interpret breeding values published in bull catalogues of various countries several international surveys were conducted and published as Interbull Bulletins. These included also information about the breeding programs as regards number of tested bulls per breed etc. The reviews of domestic methods and publication of breeding values varied considerably between countries and Interbull therefore worked out guidelines for harmonization and improvement of methods to apply. By time these reviews included more and more traits.

Interbull becomes a permanent sub-committee of ICAR

In 1988 the activities had become quite extensive and reached a regular format with seminars for information exchange, reviews and working out guidelines. A well attended international forum for scientists and industry representatives had been established. An

institutional organization was now needed to handle both economic and administrative matters. ICAR offered to "host" Interbull as a permanent subcommittee with participating countries as members. However, IDF and EAAP continued their support of Interbull and also FAO declared its active support. The secretariat of Interbull continued to be situated at the Dept. of Animal Breeding and Genetics at SLU, Uppsala. It was in the following period often consulted when importers and exporters for obvious reasons could not agree upon the appropriate conversion formulas to apply! In the meantime Dr Larry Schaeffer at Guelph University had worked out a better methodology, sometimes described as a Super BLUP procedure, for joint analysis of national evaluations from multiple countries.

Establishment of the Interbull Centre

In 1989 the Interbull Steering Committee under the leadership of Brian Wickham (New Zealand) decided, after discussions at previous Interbull seminars, to develop a concept for an international genetic evaluation service based on a linear model for evaluation of national data from participating countries. After a tender procedure the Dept. of Animal Breeding and Genetics at SLU, Uppsala, supported by the Swedish Farmers' union, the dairy industry and the Agricultural Board, was chosen to establish the Interbull Centre. The Swedish organizations mentioned above generously guaranteed the financing during a 5-year development period after which the services should be fully paid by the customers.

The successful recruitment of Georgios Banos from the animal breeding research group in Guelph as the first "Director" and only employee of the Centre was crucial for the development of international genetic evaluations. After a period of intensive collaboration and data exchange between some European countries and with Canada and USA a first pilot study on international evaluation of AI bulls was conducted. The study was supported by COPA/COGEA (EU farmer's organization) and meant that EU seized the idea of international collaboration in this area rather than establishing a centre of its own for bovine evaluations.

International genetic evaluations proven feasible

Results of this pilot study were published in 1993 and clearly showed the feasibility of international genetic evaluations and how the logistics of electronic data exchange could be arranged. At the Interbull meeting held in Aarhus, Denmark, in 1993 the decision was made to offer international genetic evaluations as a service to interested countries. It was by some exporters considered as an “anti-marketing tool”, but found it worth support in light of the increasing global use of AI bulls and the expressed need for objective information about genetic sources available worldwide.

In the following year a workshop was arranged in Uppsala to work out a code of practice for participation in the evaluations and the French group at INRA worked out tests for validation of the quality of data to be delivered to Interbull for the international evaluations. Since then most countries have struggled with the validation criteria set up. But they have undoubtedly led to many improvements of the national evaluation systems!

Rapidly expanding service

In the autumn of 1994 the first international evaluation took officially place although only with data from the Nordic countries. In the spring of 1995 the first fully international genetic evaluation took place for production traits of bulls of the Holstein and Ayrshire breed groups of 9 countries. Initially, the genetic correlation was assumed to be one between all countries, but the results were criticized as the ranking of bulls was the same in all countries. Thanks to development of the MACE (Multiple Across Country Evaluation) procedure by Dr Schaeffer and the PhD thesis work by August Sigurdsson at the Interbull Centre a methodology for estimation of genetic correlations was developed and put into practice. Thereby the ranking of all bulls were made according to the scale and environment of each country. This was a great step forward, leading to more diversified global use of bulls, although the methods for estimation of these genetic correlations still are at debate!

In 1996 the EU Commission had decided to appoint the Interbull Centre as its official reference laboratory, and has since 1998 continuously supported the Centre financially.

In the first five years of the service it advanced to include 6 breed groups and 23 countries and it had become financially self-sustaining according to the original plan! After that most of the expansion has dealt with inclusion of other traits than production. Today the international genetic evaluations comprise 6 breed groups (Ayrshire, Brown Swiss, Guernsey, Holstein, Jersey and Simmental) of 26 countries in Europe, North-America, Asia, Oceania and Africa. All in all about 125,000 bulls are evaluated four times a year for production (3 traits), conformation (20), udder health (2), longevity (1) and calving traits (4). Female fertility is expected to be included next year.

What else did we achieve?

Beyond the achievement of a regularly functioning international genetic evaluation service, the following achievements may in retrospect be considered quite important:

- Opportunities to globally select bulls according to rather broad or various breeding objectives suitable for different environments or regions around the world
- Stimulation of developments for national evaluation systems to meet high quality standards
- Coordination of R&D activities globally into networks focusing on improvements of genetic evaluation methods in theory and practice
- Establishment of an annual open international forum for exchange of information and discussion among scientists and practitioners of genetic evaluations on R&D activities
- Continuous documentation of recent research presented at Interbull meetings in regularly published Interbull Bulletins
- Increased transparency of genetic evaluation methods practiced by member organizations through continuous documentation of methods at the Interbull website (www.interbull.org).

Professional people and generous support

The achievements of Interbull are greatly resulting from a unique international cooperation between scientists and industry representatives around a common goal, to genetically improve domestic dairy cattle populations through global use of the best genetic resources. Wise leadership by the Interbull chairpersons Brian Wickham and Jean-Claude Mocquot, and professional and dedicated work by the Interbull Centre directors Georgios Banos, Ulf Emanuelson and Freddy Fikse and their staff at the Interbull Centre has been of utmost importance. The financial support, initially only from Sweden, but later on through generous grants from USDA and EU, has been greatly appreciated. Among the breed societies Interbull has enjoyed a professional cooperation with the US Holstein when outsourcing parts of the conformation evaluations to a North-American consortium. For its size the World Guernsey Cattle Federation has contributed with a very much appreciated support of the Interbull activities.

A rewarding concept for cooperation

Interbull evaluations have become an internationally accepted standard for evaluation of AI bulls for domestic and global use. But more than that, the Interbull concept has pointed at an interesting and rewarding way of cooperation between science and practice in a very competitive market. And that concept will be important to foster also in the future.

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