

Interbull Scientific Advisory Committee (SAC)

Annual report (2010-2011) to the Interbull Steering Committee

Interbull SAC: Vincent Ducrocq, Dan Gianola, Mike Goddard, Georgios Banos (convener)

Since 2007 the Interbull SAC has been advising Interbull to assume a leading role in international genomic evaluations both as a provider of genomic breeding values and also as a clearinghouse for genotypes and/or SNP data. We have also advised Interbull to become involved in the coordination of international collaborative work on optimal ways of combining genomic data.

During the present reporting period SAC members attended the Interbull genomics workshop in Guelph (February 27-28, 2011; Ducrocq, Gianola, Goddard), met on August 26, 2011, together with Larry Schaeffer (formerly of SAC), and engaged in e-mail discussions.

Some thoughts on short-, medium- and long-term Interbull activities, and indicative approximate (arbitrary) percentage of present-time dedicated to each follow. In all cases, Interbull is encouraged to focus its resources on the implementation of new scientific advances for the development and enhancement of its services, and outsource pertinent required research activities to appropriate research organisations in member countries. This is has also been an earlier advice by SAC but becomes especially relevant to genomic evaluations, where many research issues still need to be addressed.

Short-term (ca. 1 year - 30%)

1. The need for international comparisons of genomic breeding values, especially among farmers, is the driving force for further GMACE development, ensuring the delivery of “unbiased” results. The method is still suboptimal, does not yield all the envisaged benefits of an international genomic collaboration and is fraught with bias validation issues but is potentially useful to farmers who import foreign semen and animals.
2. The suggested alternative of a bivariate analysis of direct genomic and conventional breeding values as correlated traits merits attention.
3. Genomic service demands also create an opportunity for Interbull to act as a clearinghouse for genotypes, where members may upload genotypes of bulls available for sale or with semen available for export, and other members interested may download this information.
4. As the genomic evaluations are still a relatively new development, a member and stakeholder survey to gauge demand for the type of service desired would be beneficial.
5. Trait harmonisation is a persisting issue affecting the value of international evaluation (genomic and conventional) especially for some functional traits like fertility. Any efforts to remedy this situation will enhance the acceptability of the product.

Medium-term (1-5 years - 40%)

1. Although political and commercial issues still prevent full data availability, the wide use of genomic information globally combined with increasing collaboration in building sizeable reference populations across countries will gradually lead to a more open system, which may consolidate the role of Interbull as an international point of reference. In the medium-term, this opportunity may materialise in form of an international SNP-based evaluation. In addition to receiving genomic breeding values of bulls (and possibly cows) Interbull may collect SNP effect solutions derived nationally and calculate international multi-trait values. The latter can be used to produce international genomic values of individual animals. This

- development comes closer to utilising all information available in the various countries and to delivering the benefits of international collaboration.
2. MT-trait MACE should be incorporated in the service portfolio. This would be of particular interest to traits receiving a multiple-trait evaluation nationally (e.g. fertility, udder health). A coordination of efforts for individual countries to produce EDC suitable for MT-MACE will be required.

Long-term (> 5 years - 30%)

1. Advances in sequencing technology may render SNP obsolete as genetic markers. More than 3 billion base pairs of information will be available per genotyped animal and will need to be stored. In such a case, an important role for Interbull would be to serve as an international repository of genome sequences of bulls and cows.
2. As genome sequence data accumulate there will be an opportunity to provide genotype imputation services from e.g. the 50K array to full sequence.
3. Complete sequences will also have to match with phenotypic information to derive true genomic values or identify genes. Several technical issues currently on the table will still be relevant, as will the need for a leading international authority in the area of genetic evaluations.

As has always been the case, the primary role of Interbull remains that of a professional service provider. These services require a solid scientific platform and are often research and computing intensive. A judicious portfolio of in-house core developments and outsourced activities will be the key to allow Interbull to focus on its primary role and best serve its stakeholders.

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The Interbull SAC