



August 15, 2011

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# INTERBULL CENTRE ACTIVITY REPORT 2010/2011<sup>1</sup>

## INTRODUCTION

The Interbull Centre has undergone a very busy schedule during the 2010/2011 period. Many key developments related to the international genetic evaluations, streamlining of the operations and new demands from the Interbull community have occupied all available resources. This seems to be the situation also at the national evaluation centers, and in many cases the introduction of genomic information into the services accounts for most of the extra work. Animal breeding is changing rapidly and the excitement about genomics is completely justifiable. However, after few years of experience with genomic models, it is evident that the consequences of incorporating SNP information into routine evaluations are still to be fully understood. This is true at the national and international levels, and represents a real challenge for geneticists worldwide. As a service provider, the Interbull Centre needs to keep up with the latest developments and therefore has dedicated significant resources to address genomic analyses without losing track of the conventional evaluations.

This document describes the activities at the Interbull Centre since the last annual meeting of Interbull (Riga, Latvia, May 31-June 4, 2010). Work plans, budgets and future activities are also presented.

## SUMMARY OF BUDGETS AND FINANCES

A complete financial report can be found in Appendixes I-III. The report includes both Interbull and Interbeef activities. Although both Interbull and Interbeef are ICAR activities, they are managed separately, with distinct governances, work plans and budgets.

### Interbull

The Interbull Centre budgets and financial report for Interbull will be official pending approval by the Interbull Steering Committee after review by the 2011 Interbull business meeting in Stavanger. For 2012 and onwards a revised fee structure including services related to genomic evaluations has to be applied. The result for 2010 showed a surplus of € 8,333 instead of a small budgeted deficit. Service fees increased due to higher participation rate. The EU commission has continued its support of the Interbull Centre and an increase from € 91,000 to 150,000 was achieved for 2010, and is also allocated for 2011. The extra 60,000 was directed to the Center for immediate needs to accommodate testing methods including genomic information. Costs were lower than budgeted, although salary costs were slightly higher due to the lower value of the Euro compared to SEK at the

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<sup>1</sup> Presented at the 2011 Interbull Meeting, Stavanger, Norway, August 26-28, 2011

budgeting time in 2009. Outsourced activities included computation of MACE for conformation traits by the North-American consortium and for programming and data base development.

For 2011 (revised according to the actual situation) the financial prognosis indicates a negative result of about €22,000, which is considerably less than expected in May 2010. The primary reasons are increased service fees as a result of increased participation rate. Portugal has joined the evaluations and some countries have included more traits or breeds for the evaluations. EU has decided to keep its extra support of €60,000 due to the required developments in genomic evaluation. The Intergenomics project for the Brown Swiss breed means also a contribution to cover its extra costs. The prognosis for 2011 is still subject to uncertainties due to fluctuations in the exchange rates.

For 2012 a new fee structure accommodating for validations and evaluations including genomic information is required. The extra EU contribution is requested to continue, but there is presently no advice on the contribution for 2012. Alternative financing strategies must therefore be developed. It is also unclear at this stage what new service activities might be included in the 2012 portfolio. However, the fee structure presented for 2012 and onwards assumes the introduction of some form of GMACE that all Interbull participants will benefit from. The present level of service fees has not changed since 1999. Increased service fees have so far solely been the result of increased participation rate. The suggested new fee structure (see Appendix) is based on both an increased basic fee and an increase of the part of the fees that depends on number of recorded cows. The alternative levels depend on the outcome of the EU contribution.

## Interbeef

The Interbull Centre financial report for Interbeef has been approved in the working group meeting at the ICAR Meeting held in Bourg-en-Bresse (France) 20-21 June 2011. The initial three-year project was completed on May 2010 and a new service and research agreements are in final phase of negotiation.

## PERSONNEL

The Interbull Centre staff is employed by the Department of Animal Breeding and Genetics of the Swedish University of Agricultural Sciences (SLU) even though the content of work and budget for the Centre and the Secretariat is decided upon by the Interbull Steering Committee.

The staff employed at the Interbull Centre during the period reported herein consisted of:

- Prof. Jan Philipsson, Interbull Secretary
- Dr. João Dürr, Director
- Dr. Jette Jakobsen, Senior Scientist and Deputy Director
- Dr. Hossein Jorjani, Senior Scientist
- Dr. Flavio Forabosco, Scientist
- M.Sc. Eva Hjerpe, Scientist, data manager
- M.Sc. Valentina Palucci, Scientist, data manager
- Dr. Birgit Zumbach, Post-doctoral scientist (until 31 July 2011)
- M.Sc. Anne Loberg, part time scientist and part time PhD student (dedication of 80%)
- Carl Wasserman, Data Base Administrator (started 1 Aug 2011)
- Dan Englund, System Administrator (dedication of 35%)

- Monica Jansson, Secretary (dedication of 10%)

Anne Loberg came back from maternity leave in August 2010 (for 80% of her time) and her contract was modified in 2011-04-01 so that she is researching full time as PhD student on genomics and 50% of her salary is covered by ITBC; Carl Wasserman started working at the Interbull Centre 2011-08-01 and will be responsible for the data base administration and related tasks; and Birgit Zumbach had her two year contract concluded on 2011-07-31 and is no longer at the Interbull Centre. Birgit's position was financed by the Department of Animal Breeding and Genetics as an investment to boost up the initial development of international genomic evaluations and her contribution is greatly appreciated.

The Interbull Centre has signed a research agreement with Service ICAR to streamline the service operations, and Dr. Gerald Jansen, from Italy, acts as a part time consultant in the project, performing software development and system optimization at the Interbull Centre. Dr. Jansen has provided services from January 2010 with 50% of time dedication, and will begin a full time consultancy job for the Interbull Centre in January 2012, for a period of two years. Dr. Jansen has worked on streamlining the MACE evaluations, development of the sire-dam pedigree in MACE programs and currently is dedicated to the Interbull data base development.

There were two externally financed PhD students at SLU related to the Interbull Centre activities: Mohammad A. Nilforooshan, who successfully defended his thesis entitled "Multiple-trait multiple country genetic evaluation of fertility traits in dairy cattle" in 2011-05-27, and Thierry Pabiou, who is working on national and international genetic evaluations for Irish beef cattle.

Three international students have been spending time at Interbull Centre during this period: Maria Annunziata Pintus, a PhD student from Italy, who worked on principal component analyses applied to genomic evaluation, under the supervision of Hossein Jorjani; Clotilde Patry, a PhD student from France, who investigated the impact of pre-selection biases on genomic evaluations, under the supervision of Hossein Jorjani; and Mara Battagin, a PhD student from Italy, who worked on international harmonization of conformation traits, under the supervision of Flavio Forabosco.

The Interbull Centre also received visiting scientists: Gabriel Rovere, from Universidad de la República, Uruguay, spent two months in Uppsala investigating the feasibility of including Uruguayan data on Interbull evaluations; Nicolò P.P. Macciotta, from Università di Sassari, Italy, went to Uppsala to work on principal components related to genomics; Frank Siewerdt, from University of Maryland, USA, visited the Interbull Centre to look into possible partnerships; Chrilukovian B. Wasike, a PhD student from Kenya, spent two weeks at the Interbull Centre examining the feasibility of including Kenyan data into Interbull evaluations; finally, François Guillaume, from INRA, France, spent some time at the Interbull Centre to install the INRA programs and provide training on the QTL-BLUP method of genomic evaluation. The Interbull Centre had also the privilege of being visited by Uffe Lauritsen, ICAR president, and Xavier David, from Uniceia, France.

Finally, Jette Jakobsen spent four weeks at the CDN headquarters, in Guelph, Canada, working on Interbull related projects in cooperation with the CDN staff.

## SERVICE AND OPERATIONS

Test evaluation runs were performed in September 2010 and January 2011. Many changes in national evaluations have been introduced during this period, and are all described in the service reports published on [www.interbull.org](http://www.interbull.org) after each routine evaluation.

Routine international genetic evaluations for production traits were computed as scheduled in August 2010, December 2010, April 2011 and August 2011. Portugal joined the evaluation for Holstein from April 2011. The Netherlands and Flanders joined the evaluations for Red Dairy Cattle in August 2011.

International genetic evaluations for Brown Swiss, Guernsey, Holstein, Jersey and Red Dairy cattle conformation traits were computed according to the same schedule as for production traits.

Udder health evaluations for Brown Swiss, Guernsey, Holstein, Jersey, Red Dairy Cattle and Simmental were also computed according to the same schedule as production traits. In August 2010, Poland (Holstein) and Great Britain (Brown Swiss) participated for the first time. Lithuania joined the evaluations for Holstein and Red Dairy Cattle in December 2010. Latvia participated in the evaluations for Holstein and Red Dairy cattle for the first time in April 2011. Portugal joined the evaluation for Holstein from April 2011.

Direct Longevity evaluations for Brown Swiss, Guernsey, Holstein, Jersey, Red Dairy Cattle and Simmental were computed according to the same schedule as for production traits. In August 2010, Great Britain participated for the first time in the evaluations for Brown Swiss and Denmark-Finland-Sweden moved from national evaluations to one joint Nordic evaluation.

Calving trait evaluations for Brown Swiss, Holstein and Red Dairy cattle were computed according to the same schedule as for production traits.

Female fertility evaluations for Brown Swiss, Guernsey, Jersey, Holstein, Red Dairy Cattle and Simmental were computed according to the same schedule as for production traits. South Africa participated in the evaluations for Holstein and Red Dairy cattle for the first time in December 2010.

International genetic evaluations for workability for Brown Swiss, Holstein, Jersey and Red Dairy Cattle were computed according to the same schedule as for production traits.

**Table 1** - The total numbers of populations in the most recent (August 2011) routine Interbull genetic evaluation services were as follows:

Breed Group	Production	Conformation	Udder Health	Longevity	Calving	Female Fertility	Workability	TOTAL
Brown Swiss	10	7	9	9	5	7	5	<b>52</b>
Guernsey	6	4	5	5	0	4	0	<b>24</b>
Holstein	28	21	27	18	12	18	6	<b>130</b>
Jersey	11	9	8	7	0	7	3	<b>45</b>
Red Dairy Cattle	14	8	12	7	3	8	4	<b>56</b>
Simmental	11	0	9	3	0	2	0	<b>25</b>
<b>TOTAL</b>	<b>80</b>	<b>49</b>	<b>70</b>	<b>49</b>	<b>20</b>	<b>46</b>	<b>18</b>	<b>332</b>

## Validation of Genomic EBVs

Following the decision taken by the Interbull Steering Committee during the 2010 ICAR/Interbull Meeting in Riga, Latvia, from May 31 to June 4, 2010, Interbull officially released the first validation procedure for national genomic evaluations (GEBVs) as a new service in June 18, 2010. At this initial stage, the official validation was restricted to the trait protein yield, and it was open to all populations participating in Interbull international (conventional) evaluations which have a genomic evaluation implemented. The results of the validation tests are published simultaneously at ICAR and Interbull web pages.

The Directorate of Animal Health and Welfare of the European Commission has accepted the Interbull/ICAR recommendation to consider genomic evaluations validated by the GEBV test as valid procedures within EU states in a public official communication.

Additional rules were defined by the Steering Committee in the Guelph Technical Workshop (March 2011):

- GEBV validation should be performed the first time a country joins Interbull genomic evaluations (or simply validations) and every two years afterwards. Then validation is needed whenever there is a major change either in the genomic evaluation or in the conventional evaluation. Additionally, if there is a major change in the reference population a new validation should be required.
- The expected regression coefficient for the validation model 1 should be within the confidence interval of plus minus two times the standard error (t-test). For very large reference populations, however, the SE becomes too small and makes the above criteria too restrictive. Therefore, it is proposed a “biological confidence interval” of  $\pm 0.1$ .

The GEBV validation test calendar, from the beginning:

YEAR	DATA SUBMISSION	RESULTS RELEASE
2010	July 12	August 9
2010	November 2	November 30
2011	May 9	June 6
2011	July 4	August 1
2011	October 31	November 28

## Database developments

Over the last year DB development has proceeded on several fronts, namely consolidation of the pedigree module, intensive development of the (G)EBV module for national proofs and planning for future modules.

The work on the pedigree module involved numerous enhancements to functionality as well as a number of bug fixes. Key improvements concerned the processing of potential duplicate animals and ID aliases (links).

Considerable effort went into recovering missing pedigree information from the traditional pedigree files (from 010 files) and ID cross reference files, taking care to protect data already loaded in the DB by member organizations. This work was essential to provide comparable pedigree data for the SD-MACE pilot runs performed over the past year.

The (G)EBV module for national proofs was the main focus of development.

A decision was made to shift development of this module from the IT department of the SLU to an external consultant (Gerald Jansen) working directly with ITBC staff, as well as to shift the platform for the restricted access web site from Windows+PHP to Linux+Python in order to achieve better integration with the environment for computation of MACE evaluations. While this choice has caused some delays in the project, development is now proceeding rapidly.

All necessary database structures and embedded routines for the (G)EBV module have been completed. These include an improved set-up for registering and tracking batch processing tasks (compared to the pedigree module), structures to handle past and current evaluation runs, upload permissions, verification results from uploaded proof and parameter files (current vs. previous run) and storage of the verified parameters and proofs as well as extraction routines for the genetic evaluation run. The new web interface is still under active development. Functions for management of evaluation runs and uploading of parameter and proof files are complete. Programs for verification in batch mode are complete but some work remains to fully integrate the results with the DB and web user interface. The required web functionality for monitoring uploads and extracting proofs for an evaluation has been fully specified and its development is under way.

Regarding planning for future modules, functional requirement specifications are being actively developed for a module for MACE outputs (proofs, correlations, sire variances, conversions, checks), a module for beef phenotypes, as well as a module for genotype exchange (still in a preliminary stage).

Finally, a dedicated DB administrator/developer has been recruited and commenced work at the ITBC on August 1.

## Quality assurance

Commencing July 2011, the Interbull Centre has contracted QP Projects AB, as a consulting firm to guide the staff through the ISO 9001:2008 certification process. Initially Valentina Palucci and João Dürr build the basic documentation (Management manual), and then the rest of the staff will also become involved. A timeframe of 4 up to 6 months will be necessary before the Centre is ready to

undergo a certification auditing, which will be carried out by the Bureau Veritas Certification Sverige AB. This action follows an objective defined in the Interbull strategic plan.

## Meetings

The 2010 Interbull Meeting was held in Riga, Latvia, from May 31 to June 4, 2010, and counted with 166 participants from 32 countries. At the open meetings, 20 reports were presented.

Once again Interbull and ICAR held a joint session on “Genomics applied to livestock”, which was chaired by Reinhard Reents and counted with 4 invited papers.

As had occurred in previous editions, Interbull was invited to jointly organize a session on “Dairy cattle and buffalo breeding” at the WCGALP 2010 in Leipzig, Germany (August 2010), having Hermann Swalve as chairman.

Interbull organized an International Technical Workshop with the theme “Establishing the framework for International Genomic Evaluations” February 27-28 in Guelph, Canada, and was co-organized with the Canadian Dairy Network. The program was a combination of invited reports, group work and debates.

The Interbeef working group met in three occasions during this period: at the 37th ICAR Biennial Session in Riga, Latvia (May-June 2010), during the WCGALP 2010 in Leipzig, Germany (August 2010) and at the 2011 ICAR Annual Meeting, in Bourg-en-Bresse, France, (June 2011).

## Information activities

The Interbull Centre, following recommendation of the Interbull Steering Committee, realized online surveys on two topics: parentage verification and sequencing of cattle. Results will be presented on the 2011 Interbull business meeting in Stavanger, Norway.

The Interbull website has been routinely updated with service information, Interbull events details, institutional facts and news. There are over a thousand subscribers to the Interbull newsletter who receive regular updates by email.

Interbull Bulletin 41, proceedings from the Technical Workshop in Paris, and Interbull Bulletin 42, proceedings from the 2010 Interbull meeting were published in this period. Interbull 43, proceedings from the Technical Workshop in Guelph, is on the final stage of editorial work (papers are already available on the “Events” page). Over the years, the Interbull Bulletin has become a reference for genetic evaluation methods, and contains always the most recent developments in both national and international dairy applied genetics. Given the facility of access that the internet provides, it has been decided to restrict the distribution of printed copies only to the organizations closely related to Interbull. Individuals are more than welcome to search and freely download all contents from the webpage.

The Interbull Centre director, João Dürr, accompanied the ICAR president, Uffe Lauritsen, to the General Assembly of the Pan-American Dairy Federation realized in Lugo, Spain, in October 2010. The effort is part of ICAR strategy to attract more Latin American members, which can eventually also join Interbull. João Dürr also participated as invited speaker on the following events: the European Brown Swiss Conference in October 2010, in Novo Mesto, Slovenia; the FAO Intergovernmental Technical Working Group, in November 2010, in Rome, Italy; the 2011 ICAR Annual Meeting, in



Bourg-en-Bresse, France, in June 2011; and the 48<sup>th</sup> Annual Meeting of the Brazilian Society of Animal Science, in July 2011, in Belém, Brazil. The Interbull secretary Jan Philipsson, participated as invited speaker at the 2010 ICAR meeting in Riga, Latvia; at the World Guernsey conference in Guelph, Canada, July 2010; at the Austrian International Cattle Breeding conference in Wels, September 2010, and at the European Holstein and Red Holstein conference held in Stockholm, July 2011.

## **RESEARCH AND DEVELOPMENT**

The following is a brief summary of research and development activities conducted at the Interbull Centre or with the involvement of the Interbull Centre staff since June 2010.

### **MACE with sire-dam relationships**

Streamlining of the genetic evaluation system was finalized including shift to an iterative solver allowing for unlimited number of countries participating in the international genetic evaluations (was earlier a limit on 32 countries). Also, pedigree only from the new Interbull database was utilized. Parallel December 2010 MACE runs for all breeds and traits using S-MGS pedigree and SD pedigree relationships were conducted followed by an official test run in January 2011. Concerns from the memberships were raised due to decreases in reliabilities for some bulls and due to re-rankings of bulls when changing from the S-MGS evaluation system to the S-D evaluation system. Due to these concerns the SD-MACE evaluation system was withdrawn from the services until all concerns have been addressed and the routine evaluations have continued using MACE with S-MGS relationships. Intense investigations have been going on in order to resolve the issues which for most were caused by missing pedigree and missing cross-references in the new database. Intensive uploading from the national centers has taken place, which resolved most issues. The issue of re-ranking has been studied and can be tailored to the inclusion of the dam in the pedigree and therefore also in the computation of the parent average of the bulls. The lower reliability of the bull proof the larger the impact of the PA and therefore the bulls that changed the most with the change of model were the bulls with the lowest reliability. What remains under investigation is verifying the impact of the bull-dams in the SD-MACE model.

### **MS-trend validation**

New research collaboration between the Interbull Centre, MTT and NAV has been established to address three main targets: development of a model validation test for routine use based on Mendelian sampling deviations; further development of the methodology and software for the implementation of MT-MACE evaluations; and optimization of computational implementations of international evaluation models at ITBC. Since MS-trend validation is between the project objectives, a specific research proposal will be presented to the ITC in the near future explaining in detail the approach adopted. Anna-Maria Tyrisevä, who was already involved in the previous project on genetic correlations, will work again on this project. Freddy Fikse, who worked on the topic previously, has been invited to participate in the project and accepted.

### **Intergenomics**

The ultimate goal of the Intergenomics project is to develop a framework for genomic evaluations of small populations using an international common reference population and carried out by the Interbull Centre. The initiative currently involves only the Brown Swiss breed, but its results will be useful for other situations in which the size of the population is a limiting factor for developing



genomic prediction equations. Participating countries are: Austria, France, Germany, Italy, Slovenia, Switzerland and United States. Implementation has included 33 traits that are evaluated in the international genetic evaluations of Brown Swiss populations. A standard G-BLUP model is used for estimating SNP effects in all participating country scales, using MACE EBVs as phenotypes. The Intergenomics results have passed the GEBV test in the August 2011 validation run and routine service is planned to start in autumn 2011.

### **MACE for bulls with genomically enhanced breeding values**

Genomic MACE (GMACE), as developed by Pete Sullivan and Paul VanRaden, handles GEBVs from several countries when the proportion of shared genotypes among countries is the same. This is seldom the case and it was therefore decided to work on a simplified version of GMACE (S-GMACE) in the meantime. The S-GMACE should include only GEBV of a bull from one source and conventional EBVs from other sources and thereby abandon the need for handling of residual covariances coming from genotypes from several sources. Rules for selection of just one GEBV per bull were settled and utilized for a S-GMACE pilot study and results presented at the Guelph workshop, February 27-28, 2011. The main concerns raised based on the pilot study were due to the selection of just one GEBV per bull and due to inflation of reliabilities and proofs during the MACE system as the problem of residual correlations on family level was not avoided. It was decided to do a new data call in April 2011 in order to conduct further research on S-GMACE and GMACE. The cohort of bulls of largest interest is young genotyped bulls without progeny test and the research has therefore mainly been focused on this group. The results of the study will be presented during the Interbull Open meeting in Stavanger. The active co-operation of Pete Sullivan in the project is greatly appreciated.

### **Interbeef**

The initial research project ended in May 2010, and the working group has been discussing the continuation of the project regarding expansion, priorities and financial support. The current status is that methodology to establish an international genetic comparison using phenotypes was developed by INRA using adjusted weaning weight as the pilot trait, including 5 different populations of Simmental cattle and 4 populations of Charolais cattle. The method has been productionized at the Interbull Centre and can be routinely applied. The intended next steps are to start service operations for adjusted weaning weight at the Interbull Centre and continue developing methods at research partners to be defined among participating organizations.

## R&D Funding

In addition to funds raised from service fees, research and development activities at the Interbull Centre are financed by grants from the Swedish University of Agricultural Sciences (SLU), the European Union, and the World Guernsey Cattle Federation (WGCF).

Investments are made in development of methodologies for inclusion of genomic information in international genetic evaluations financially supported by the European Union. A pilot project initiated by the European Brown Swiss organization is conducted in collaboration with most national Brown Swiss organizations globally (Intergenomics).

Contributions of the above organizations to the future development of Interbull services are gratefully acknowledged. Contributions made to R&D activities in other countries and organizations leading to improved or expanded Interbull services are also much acknowledged.

## INTERBULL PUBLICATIONS/PRESENTATIONS

Interbull Bulletin No. 41. Proceedings from the Interbull Technical Workshop, Paris, France, March 4-5, 2010.

Interbull Bulletin No. 42. Proceedings from the 2010 Interbull Meeting, Riga, Latvia, May 31 to June 4, 2010.

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Jorjani, H. 2010. A general genomics simulation program. Proc. Interbull Meeting, Barcelona, Spain, August 21-24, 2009. Interbull Bulletin 40, 202-206.

Jorjani, H. 2010. Validation of genomic evaluation models. WCGALP Proc. 9th World Congr. Genet. Appl. Livest. Prod., Leipzig, Germany, Aug. 1-6 2010, Paper 801, 4 pp.

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## WORKPLANS

### Services

Routine evaluations for production, conformation, udder health, longevity, calving, female fertility and workability traits are scheduled with the following release dates:

2011	December 6
2012	April 3 August 14 December 4
2013	April 2 August 13 December 3

Test evaluation runs for production, conformation and udder health, longevity, calving, female fertility and workability traits take place as follows:

2011	September
2012	January September
2013	January September

### Research and Development

**Table 2** - Summary of current and planned research and development activities at the Interbull Centre .

Project	Current Stage
Database	On-going, partially implemented
Female pedigree in MACE	Decision in Stavanger
Intergenomics	Passed the GEBV test, implementation
GMACE	Results to be presented in Stavanger

### Meetings

The 2011 Interbull meeting, in conjunction with the 2011 EAAP in Stavanger, Norway, August 26-28, 2011.

The 2012 Interbull Meeting, in conjunction with the 38<sup>th</sup> ICAR Session. Cork, Ireland, May 28 to June 1<sup>st</sup>, 2012.

### Planned Publications

Interbull Bulletin No. 43. Proceedings of the 2011 Interbull Technical Workshop, Guelph, Canada, February 27-28, 2011.

Interbull Bulletin No. 44. Proceedings of the Interbull Open Meeting, August 26-28, 2011, Stavanger, Norway.

## Appendix I

### INTERBULL CENTRE FINANCES AND BUDGETS, July 2011

#### Comments to accounts and budgets

The financial situation of the Interbull Centre (excl. Interbeef) is presented in Appendix II according to the same format as in previous years. The accounts have been audited within the normal procedures for the Swedish University of Agricultural Sciences (SLU). All figures are given in Euros. The table includes the final accounts for 2010 in comparison with the accounts for 2009 and the budget for 2010. A prognosis for 2011 is made according to the expectations as of the beginning of July 2011. For 2012 alternative budgets are presented based on a suggested revised fee structure accommodating for inclusion of genomic information in the international genetic evaluations.

#### Accounts for 2010

The result for 2010 showed a surplus of € 8,333 instead of a small budgeted deficit. Service fees increased, primarily as a result of more countries participating in more trait and breed evaluations. In detail the service fees per trait group were as follows (with figures for 2009 within parenthesis):

Production €324,950 (317,029), conformation €86,249 (86,178), udder health €43,560 (43,619), longevity €37,057 (36,925), calving traits €28,957 (25,678), female fertility €49,247 (46,680) and workability traits €6,461 (6,471). In total 30 countries or consortia participate in the Interbull evaluations. The total service fees increased in 2010 (€576,481) compared to 2009 (€562,580) despite fewer recorded cows and that the fees are dependent on these numbers.

The EU commission has continued its support of the Interbull Centre and an increase from € 91,000 to 150,000 was achieved for 2010, and is also allocated for 2011. The extra 60,000 was directed to the Centre for immediate needs to accommodate testing methods including genomic information. On the other hand research grants were not at the budgeted level but still higher than the previous year. The World Guernsey Cattle Federation (WGCF) has continued its valuable support and SLU has kindly provided a post doc position on its own account for work on genomics. The technical workshop on genomics held in Paris in March 2010 was gratefully sponsored by the French organizations.

Costs were lower than budgeted, although salary costs were slightly higher due to the lower value of the Euro compared to SEK at the budgeting time in 2009. ICAR has taken some costs for publication according to earlier commitment. The outsourced activities included computation of MACE for conformation traits by the North-American consortium, and for programming and data base development.

Interbull membership fees are handled directly by the ICAR office, Rome, Italy, and reported at the official meetings of ICAR. Membership income is used to cover overhead costs for ICAR/Interbull, some travel expenses, publications and information. The Interbull Centre also contributed € 6,930 in 2010 from service fees to cover these costs.

#### Prognosis for 2011

For 2011 (revised according to the actual situation) the financial prognosis indicates a negative result of about €22,000, which is considerably less than expected in May 2010. The primary reasons are increased service fees as a result of increased participation rate. Portugal has joined the evaluations and some countries have included more traits or breeds for the evaluations. Service fees per trait group are expected as follows: Production traits €330,973, conformation €86,259, udder health €48,660, longevity €37,114, calving traits €28,932, female fertility €50,817 and workability traits €6,466. In total 30 countries or consortia participate in the Interbull evaluations during 2011 and the total service fees are expected to € 589,221.

EU has decided to keep its extra support of €60,000 in 2011 due to the required developments in genomic evaluation. The Intergenomics project for the Brown Swiss breed means also an expected contribution of €30,000 to cover its extra costs. The prognosis for 2011 is still subject to uncertainties due to fluctuations in the exchange rates.

## Budget for 2012

For 2012 a new fee structure accommodating for validations and evaluations including genomic information is required. The extra EU contribution is requested to continue, but there is presently no advice on the contribution for 2012. Alternative financing strategies must therefore be developed. It is also unclear at this stage what new service activities might be included in the 2012 portfolio. However, the fee structure presented for 2012 and onwards assumes the introduction of some form of GMACE that all Interbull participants will benefit from. Continued support is expected by SLU, WGCF and Intergenomics.

The present level of service fees has not changed since 1999. Increased service fees have so far solely been the result of increased participation rate. The suggested new fee structure is based on both an increased basic fee (from €3,000 to 3,500 or 4,000) and a 20-25% increase of the part of the fees that depend on number of recorded cows. The alternative levels depend on the outcome of the EU contribution to reach a balanced result.

Salary costs, including social benefits, are calculated for on average of 1.15 for administrative staff, 4.2 scientists and 1.35 technical support staff. Outside the budget a 50% externally financed PhD student is working for Interbull. The contract established between Interbull and the North-American consortium on outsourcing the conformation evaluations, assumes an annual basic fee of 51,000. Furthermore, work on Interbull programs and their streamlining are outsourced to Gerald Jansen through Service ICAR.

## Interbeef

The initial pilot project period started June 2007 and ended May 2010. At the end of the project there was an accumulated deficit of 37,793€. This deficit was picked up by SLU in a revised budget for 2010, assuming a two year prolongation of the project with full cost financing by the ICAR customers (100,000€ per year for 2011 and 2012). During 2010 only 0.5 scientist worked in the project. As no prolongation of the project has been reached beyond 2010, no costs are presently taken by the Interbeef account until a new service agreement is signed and a work plan established.



## Appendix II

### Interbull Centre Finances and Budgets (Euro), July 2011 (excl. Interbeef)

Exchange rate SEK/Euro in 2010 was 9:57. In July 2011 it was approx 9:00

	2009	2010		2011		2012a <sup>2</sup>	2012b <sup>3</sup>
	Actual account	Budget	Actual Account	Budget May 2010	Projected result July 2011	Proposed Budget	Proposed Budget
<b>INCOME</b>							
1. Service fees	562,580	563,000	576,481	550,000	589,221	738,085	800,756
2. Research grants	78,743	121,000	88,913 <sup>4</sup>	70,000	61,135	66,000	66,000
3. EU grants	91,000	151,000	151,000	151,000	150,000	150,000	90,000
4. Other income	7,519	-	-	-	30,000	30,000	30,000
<b>Total</b>	<b>739,842</b>	<b>835,000</b>	<b>816,394</b>	<b>771,000</b>	<b>830,356</b>	<b>984,085</b>	986,756
<b>Expenses</b>							
5. Salary costs	398,275	395,000	416,711	428,000	494,000	556,000	556,000
6. Computer costs	51,506	45,000	46,981	55,000	40,000	55,000	55,000
7. Travels, conferences	66,213	50,000	37,543	55,000	40,000	40,000	40,000
8. Publications	4,405	10,000	803 <sup>5</sup>	7,000	2,000	3,000	3,000
9. Phone, fax, postage	4,924	12,000	3,253	8,000	5,000	5,000	5,000
10. ICAR	6,930	8,000	6,930	7,000	6,930	6,930	6,930
11. Miscellaneous	7,342	20,000	14,180	10,000	7,000	10,000	10,000
12. Outsourced activities	49,856	135,000	129,104 <sup>6</sup>	81,000	88,000	103,000	103,000
13. Office and univ. adm. costs	146,141	165,000	152,556	162,000	170,000	195,000	195,000
<b>Total</b>	<b>735,592</b>	<b>840,000</b>	<b>808,061</b>	<b>813,000</b>	<b>852,930</b>	<b>973,930</b>	<b>973,930</b>
<b>Balance</b>	<b>4,250</b>	<b>-5,000</b>	<b>8,333</b>	<b>-42,000</b>	<b>-22,574</b>	<b>10,155</b>	<b>12,826</b>
<b>Accum. Balance</b>	<b>141,540</b>	<b>136,540</b>	<b>149,873</b>	<b>107,873</b>	<b>127,299</b>		

<sup>2</sup> Assumes a continued EU support of 150,000; a basic fee increase from 3,000 to 3,500 plus a 20% increase of the service fees

<sup>3</sup> Assumes no extra 60,000 from EU; Basic fee increase to 4,500 and a 25% increase of service fees

<sup>4</sup> SLU: 63,604; WGCF: 8,349; Intergenomics: 17,500

<sup>5</sup> ICAR has taken a further cost of 12,565

<sup>6</sup> North-American consortium: 51,000; Program and data base developments: 78,109

## Appendix III

### Interbeef finances and budgets (Euro), May 2011

Exchange rate SEK/Euro in 2010 was 9:18.

	2007	2008	2009	2010		
	Actual account	Actual account	Actual Account	Account May 2010	Rev. budget May 2010	Actual account Dec 2010
<i><b>INCOME</b></i>						
Grants cattle breed org.	38,000	65,000	65,000	27,000	51,000	26,000
ICAR	15,000	15,000	15,000	-	9,000	9,000
SLU grants	-	-	-	-	38,000	38,000
<b>Total</b>	<b>53,000</b>	<b>80,000</b>	<b>80,000</b>	<b>27,000</b>	<b>98,000</b>	<b>73,000</b>
<i><b>Expenses</b></i>						
Salary costs	31,369	52,955	55,529	23,000	30,000	28,068
Computer costs	7,558	10,778	8,075	3,000	10,000	6,279
Travels, conferences	11,265	5,109	5,401	4,000	6,000	5,658
Miscellaneous	648	1,645	108	1,000	2,000	1,500
Office & adm costs	14,229	17,846	17,278	7,000	12,000	12,317
<b>Total</b>	<b>65,069</b>	<b>88,333</b>	<b>86,391</b>	<b>38,000</b>	<b>60,000</b>	<b>53,822</b>
<b>Balance</b>	<b>-12,069</b>	<b>-8,333</b>	<b>-6,391</b>	<b>-11,000</b>	<b>38,000</b>	<b>19,178</b>
<b>Accum. Balance</b>	<b>-12,069</b>	<b>-20,402</b>	<b>-26,793</b>	<b>-37,793</b>	<b>207</b>	<b>19,385</b>

**Note:** Income and costs refer to the Interbeef activities run by SLU on behalf of the ICAR beef working group. Further activities were conducted by ICBF (Ireland) and INRA (France) corresponding to one full time scientist per year and organization.