

# Interbull Centre Activity Report 2012/2013



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# INTERBULL CENTRE ACTIVITY REPORT 2012/2013<sup>1</sup>

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<sup>1</sup> Presented at the 2013 Interbull Meeting, Nantes, France, August 23-25, 2013

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## INTERBULL CENTRE

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*The Interbull Centre is the operational unit of the ICAR permanent sub-committee Interbull, and also holds the status of European Union Reference Laboratory (EURL) for Zootechnics (Bovine Breeding).*

## INTRODUCTION

The Interbull Centre is a section of the Department of Animal Breeding and Genetics of the Swedish University of Agricultural Sciences (SLU), and acts as the operational unit for Interbull and Interbeef, a permanent subcommittee and a working group of the International Committee for Animal Recording (ICAR), respectively. Additionally, the Interbull Centre holds the status of the European Union Reference Laboratory for Zootechnics. A significant increase in the workload of the center has taken place during the past years, both by the expansion of the international genetic evaluations to include new populations and new traits and by the addition of new items to the service portfolio. The new scale of activities and responsibilities required a severe reorganization of the operation in order to respond to the new demands and be able to deliver world class services. Investments were made to streamline operations and to implement a quality assurance system, besides developing the new services demanded by customers. The transition is still undergoing, not only due to its permanent nature, but also because it requires a cultural change among staff members, stakeholders and customers. Nevertheless, significant achievements in the right direction have been made and this stimulates the Interbull Centre to continue pursuing its goal: providing genetic information services and applied research for improvement of livestock to a worldwide network and fulfilling its mandate as a reference laboratory for the European Union.

This document describes the activities at the Interbull Centre since the last annual meeting of Interbull (Cork, Ireland, May 28 – June 1st, 2012). Work plans, budgets and future activities are also presented.

## BUDGETS AND FINANCES

A complete financial report and budgets can be found in Appendices 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, and therefore specific clarifications are provided separately.

The Interbull Centre budgets and financial report for Interbull will be official pending approval by the Interbull Steering Committee after review by the 2013 Interbull business meeting in Nantes.

## PERSONNEL

The Interbull Centre staff are employed by the Department of Animal Breeding and Genetics of the Swedish University of Agricultural Sciences (SLU) even though the work plans and budgets for the Centre and the Interbull Secretariat require the approval of the Interbull Steering Committee, the Interbeef working group and the European Commission.

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

- Erling Strandberg (PhD) - Interbull Secretary
- João Dürr (PhD) - Director
- Jette Jakobsen (PhD) - Senior Geneticist
- Hossein Jorjani (PhD)- Senior Geneticist
- Mohammad Nilforooshan (PhD) - Geneticist
- Eva Hjerpe (MSc) - Geneticist

- Valentina Palucci (MSc) - Geneticist
- Carl Wasserman - Data Base Administrator
- Anne Loberg (MSc) - PhD student
- Dan Englund, System Administrator (part time)
- Gerald Jansen (PhD) – consultant
- Lucie Braillon - trainee

Mohammad Nilforooshan started working for Interbull in June 2012 and has been responsible for the GEBV test besides his responsibilities on MACE and Interbeef evaluations.

The Interbull Centre has maintained the research agreement with Service ICAR to streamline the service operations and develop the Interbull data base, and Dr. Gerald Jansen, from Italy, has been acting as a full time consultant in the project, performing software development and system optimization at the Interbull Centre. Dr. Jansen has worked on streamlining the MACE evaluations and the international correlation estimations, development of the sire-dam pedigree in MACE programs, development of Interbull Data Exchange Area (IDEA) modules and also on developing new software for validation procedures.

Anne Loberg's project is on "Nature of genetic correlations", under the supervision of Hossein Jorjani. Anne has been working 80% of full time as PhD student and 50% of her salary is covered by the Interbull Centre.

Linnéa Stolt, a BSc student, worked on the project "Causes of calving difficulty and stillbirth in Swedish dairy cattle" under the supervision of Jette Jakobsen.

Lucie Braillon, an Agronomy student from ISARA-LYON, France, is in Uppsala from July to October 2013 in an internship, under the supervision of Jette Jakobsen.

## SERVICE AND OPERATIONS

### MACE Evaluations

Interbull test evaluation runs were performed in September 2012 and January 2013. Many changes in national and international 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. Table 1 shows the current number of populations and bulls included in Interbull evaluations.

Routine international genetic evaluations for Brown Swiss, Guernsey, Holstein, Jersey, Red Dairy Cattle and Simmental production traits were computed as scheduled in August 2012, December 2012 and April 2013. Argentina and Uruguay joined the evaluation for Holstein from December 2012 adding countries from one new continent to the Interbull service portfolio.

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. Portugal (HOL), Republic of Korea (HOL), and Slovenia (BSW + HOL) joined the evaluation in April 2013. Red Dairy Cattle from the Netherlands joined the evaluation in August 2013.

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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. The Netherlands (RDC) and France (FRR + BSW) participated with clinical mastitis data for the first time in December 2012. South Africa (GUE) participated for the first time for milk somatic cell score in December 2012.

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 December 2012, South Africa (GUE, RDC) and Slovenia (SIM, BSW) participated for the first time. In April 2013, the Holstein population from Slovenia joined as well.

Calving traits evaluations for Brown Swiss, Holstein and Red Dairy cattle were computed according to the same schedule as for production traits. In April 2013, Belgium (HOL) participated for the first time.

Female fertility evaluations for Brown Swiss, Guernsey, Jersey, Holstein, and Red Dairy Cattle were computed according to the same schedule as for production traits. December 2012: South Africa (GUE) participated in the evaluation for the first time. Italy (BSW) and Australia (GUE, JER, RDC, HOL) joined the evaluation in April 2013.

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. Australia (HOL, RDC, JER), United Kingdom (HOL) joined the evaluation in December 2012 while Slovenia (HOL, BSW) joined the evaluation in April 2013.

**Table 1** - Total number of populations per breed-trait group combination in the most recent (August 2013) routine Interbull genetic evaluation services. The number of traits by trait group is given in parenthesis. Number of bulls with published MACE EBVs for production traits is shown in the last column.

Breed Group	Production (3)	Conformation (23)	Udder Health (2)	Longevity (1)	Calving (4)	Female Fertility (5)	Workability (2)	TOTAL (40)	Number of published proofs (production)
Brown Swiss	10	8	10	10	5	9	6	<b>58</b>	9663
Guernsey	6	4	6	6	0	6	0	<b>28</b>	1046
Holstein	31	25	29	19	15	20	9	<b>148</b>	133028
Jersey	11	9	8	8	0	8	4	<b>48</b>	10738
Red Dairy Cattle	14	9	13	9	5	10	5	<b>65</b>	14060
Simmental	11	0	10	4	0	0	0	<b>25</b>	27135
<b>TOTAL</b>	<b>83</b>	<b>55</b>	<b>76</b>	<b>56</b>	<b>25</b>	<b>53</b>	<b>24</b>	<b>372</b>	<b>195670</b>

An extra code has been included in the parameter file since the September test run 2012 to indicate if the proofs submitted to Interbull was on the published scale or not. The retained information has

since September 2012 been included in the conversion equations indicating if conversion equations between country combinations are applicable for the trait in question.

### Validation of Genomic EBVs

A set of programs to conduct the GEBV test was made available on February 6, 2013 to all national genetic evaluation centers.

The validation of national genomic evaluations – “The GEBV test” – started to be offered as a service to Interbull users in August 2010. It has however, been a challenge to harmonize its application between users and the Interbull Centre.

The major inconsistencies in data submission observed by the Interbull Centre are:

- Differences in applied editing criteria to define the candidate and test bulls between countries and the Interbull Centre, which alters both the regression analyses and the estimation of the expected slope given selective genotyping is present;
- problems with file formats and different scales of expression between full and reduced files;
- as a consequence, results from the GEBV test when applied by the Interbull Centre may not be the same as obtained by the users, which is an undesirable situation.

For the above reasons, the Interbull Centre decided to provide participating organizations with the same software as used by the Interbull Centre. Both users and the Interbull Centre will thus be evaluating exactly the same files and results, and thereby improving communication and transparency.

The GEBV test software is a set of Python programs that harmonize input file formats, run the test, produce informative reports of the results and prepare a zip file for submission to the Interbull Centre containing all the necessary information to access the results of the test and eventually re-run the test in house.

The programs and the respective documentation are available at [https://wiki.interbull.org/public/GEBVtest\\_software?action=print](https://wiki.interbull.org/public/GEBVtest_software?action=print).

Genomic validation was compulsory for participation in the GMACE test run in February 2013, and several national evaluation centers used the new software to conduct the validation.

### Intergenomics

International genomic evaluation of Brown Swiss populations from AUT-DEU, CHE, FRA, ITA, SVN, and the USA follows the same timetable as the conventional MACE for submission of data and the distribution of results. The number of genotyped animals has increased to more than 12,000. The number of country-trait combinations in the latest evaluation (August 2013) was 175. Fine-tuning of the genomic evaluation system is an on-going activity. The latest activity in this area includes testing of different levels of polygenic effects. To achieve this, genomics evaluation using full MACE and truncated MACE data (data from 2009) for 153 country-trait combinations with different levels of polygenic effects was performed. The fraction of polygenic levels (11 levels) that were tested were from 0.01, .10, .20, ..., .90, to .99. The resulting full and reduced genomic results were used as input to the Interbull GEBV test. InterGenomics Technical Committee will evaluate the validation results and the best level for each country-trait combination will be used in the next routine evaluation.

## GMACE

A GMACE test run took place in February 2013. Fourteen Holstein populations provided GEBV data for as many as 37 traits while classical EBVs for the same traits were included from 31 populations. Only GEBV data passing GEBV validation tests; for minimal bias, and for improvement in accuracy compared to national parent averages, were included in the study. Further, national GEBVs were required to be from the same model and on the same base and scale as the national EBVs of progeny-tested bulls provided for classical MACE. GEBVs of bulls less than seven years of age and with no classical MACE proof were included for the breeding value prediction while bulls 2-5 years of age were included for genomic variance estimation. The planned GMACE August 2013 routine run was changed to an “implementation run” with the purpose to make everyone more familiar with the results before making publication compulsory. A GMACE implementation run took place in August 2013 with the participation of eight Holstein populations. The GMACE software is developed and written by Peter Sullivan, CDN and Interbull would like to express their gratitude to Pete and CDN for these developments and for the fruitful collaboration. Likewise, the guidance provided by the GMACE working group, composed of Paul VanRaden, Peter Sullivan, Zengting Liu, Gerben de Jong and Jette Jakobsen, has been extremely valuable for the development and the implementation of the methodology.

## IDEA - Interbull Data Exchange Area

Since September 2012 the IDEA pedigree module as presented during last Interbull meeting in Cork, has been put into production and widely used by all our service users, which have appreciated the improvement in functionalities and performances achieved in IDEA. Since then, Carl Wasserman and Gerald Jansen have resumed working on the development of the IDEA EBV module. The programming for the new EBV web interface is essentially complete and is currently undergoing thorough testing by the Interbull staff. The introduction of the IDEA EBV module will bring some changes in the way NGECS will send their data to ITBC. These changes include:

- 1) A new file format for parameter and proof files (current file010-20 and file115 will be replaced by a file format 300 and 301 for proofs and parameter file, respectively). The new proof file format is designed to allow considerable flexibility for the user. Each record contains one bull's evaluation (i.e. proof) and associated information for a single Breed-POP-Trait combination. One file may contain records for as many or few Breed-POP-Trait combinations as desired. It may be natural for organizations to include all traits in a trait group in the same file, as they have in the past, but this is not essential. They may also choose to upload evaluations for all breeds, populations and traits in a single file if they find that more convenient.
- 2) A convert program will be available in IDEA for the first 6 months of the EBV module introduction so to facilitate a smooth transition to the file formats.
- 3) NGECS will upload national evaluation datasets to the IDEA EBV module in similar way as they upload pedigree datasets. A downloadable Python program called *CheckProofsPara.py* which will check the format 300 proof file and the associated format 301 parameter file for formal correctness and prepare a zip file for uploading if no errors are found in the files will be made available.
- 4) NGECS will no longer need to run the Verify program prior to sending data to ITBC, since the Verify program will run automatically during uploading of data in IDEA.

- 5) The usual output of the Verify program will be available in a review page in IDEA together with two new files: a summary of the verify output, listing only the number of discrepancies, and the list of bulls losing information or deviating more than 5 standard deviations from the previous data. In the review page NGECS will be able to submit or withdraw their data: in case they decide to submit the data for the international evaluation they are required to explain in written the discrepancies found by the Verify program. Based on the data and the explanations provided it would be up to the ITBC staff to finally accept the data for the international genetic evaluation.

The ITBC staff will run a full pilot during the September 2013 test run and the introduction of the IDEA EBV module to the NGECS is scheduled to occur during the January 2014 test run.

### Quality assurance

The Interbull Centre has fully implemented an internal electronic documentation system using the concept of Wiki pages for multiple users with automatic version control. The system was simple to implement and has been a valuable improvement for the Interbull Centre operations. The latest documents released to the Interbull customers are already print views of the respective Wiki pages, whose access is made public. The system has attracted the attention of some collaborators who are interested in implementing similar systems in their organizations. More details can be obtained from Valentina Palucci.

### Interbull Bulletin

Recently the Interbull Bulletin has moved its online publication onto the Open Journal System platform (<http://www-interbull.slu.se/ojs/>). The Open Journal System is a journal management tool created with the aim of not only increasing access to research but also improving the scholarly and public quality of research. The Open Journal System was developed by the Public Knowledge Project and operates through a partnership between several universities and libraries (<http://pkp.sfu.ca/?q=ojs>).

Using the Open Journal System, the process of receiving, editing and publishing papers has become much more efficient and straight forward. Authors submit their manuscripts online directly via the Interbull Bulletin website (<http://www-interbull.slu.se/ojs/>) where it can then be edited and published within days. This will vastly decrease the amount of time between a paper being presented and then published. The Interbull Bulletin is published in print form only as a limited edition to be distributed to key organizations, not to individuals.

### Interbeef activities

The Interbull Centre has been contracted to provide international genetic evaluation services on behalf of Interbeef since beginning of 2012. A technical committee has been established to function as the expert panel that advises both the Interbull Centre and the working group on methodological matters and also reviews all results generated by the service. Each participating country is entitled to have representatives in the technical committee activities. During the implementation period, the Interbull Centre director is chairing the activities of the technical committee.

The initial step on this second phase of the project was to populate the IDEA pedigree module with the information from the Charolais and Limousin populations that have signed the service contract in

2012 (Czech Republic, Denmark, Finland, France, Ireland, Spain, Sweden and the United Kingdom). Given that the methodology for Interbeef evaluations uses raw phenotypic data as input (instead of breeding values used in MACE) the number of pedigrees uploaded into IDEA is already higher than all existing dairy pedigrees. Once the pedigree harmonization was achieved, a test run for adjusted weaning weight was carried out from September to November 2012. The main tasks were to establish a routine for phenotypic data reception and verification at the Interbull Centre, put in production the method developed by INRA using Mix99 as the analytical software and re-estimate variance components including the populations not included in the pilot studies. In December 2012 the Interbeef Technical Committee met in Uppsala to review the results of the test run and the recommendation was to repeat the test run in January-February 2013 with modification in the variance components estimation procedure and also using different editing criteria, besides having additional data supplied by the users. In March 2013, results from the 2<sup>nd</sup> test run were distributed and discussed by the technical committee during the ICAR meeting in Aarhus, Denmark, in the end of May 2013. A new data call for adjusted weaning weight is being published in August 2013 with the intention of having the first routine run in September 2013. The calendar of Interbeef routine runs has been established with runs in January and September.

Parallel to the test runs, the Interbull Centre has also carried out another data call for calving traits, and both data and codified pedigrees were transferred to the Czech Moravian Breeders' Corporation, Inc., who is the research partner responsible for developing Interbeef international evaluations for calving traits. Likewise, adjusted weaning weight data has been supplied to the Irish Cattle Breeding Federation (ICBF), who is the research partner looking into the further development of variance components estimation as well as into the inclusion of crossbred records.

In 2013, two new countries have signed the Interbeef service contract: Latvia and Switzerland. Germany is also committed to sign very soon. These countries will be participating in the Interbeef evaluation in the near future.

More information on Interbeef can be found at

[http://www.icar.org/pages/working\\_groups/wg\\_interbeef.htm](http://www.icar.org/pages/working_groups/wg_interbeef.htm).

### **Service contract with the North American consortium**

The North American consortium (NAC), involving CDN, NAAB and HA-USA, has been providing MACE evaluation services of conformation traits on behalf of Interbull since 1999. Outsourcing MACE evaluations to the NAC has been of great importance for Interbull because it made it possible to expand the services at a moment that the infrastructure at the Interbull Centre was not sufficient to accommodate all evaluations at the same time. The cooperation between the Interbull Centre and Holstein USA (representing NAC) has been valuable over the years, with mutual benefits from research, software development and sharing of service operations. However, the SC came to the realization that the current agreement with NAC should be reviewed and another basis of cooperation that reflects the current needs of Interbull should be established. The December 2013 Interbull evaluation will therefore be the last routine run under the current agreement. The Interbull Centre staff would like to publicly express their gratitude for the cordial and fruitful cooperation over all these years, particularly with Tom Lawlor and Bert Klei, who headed the Interbull activities at Holstein USA and the communications with the Interbull Centre and the ITC.

## Meetings

### *2012 Interbull Meeting - Cork, Ireland, May 28 to June 1<sup>st</sup>, 2012*

A total of 174 representatives from 35 countries gathered at the Rochestown Park Hotel in Cork, Ireland, for the Interbull annual meeting in connection with the ICAR 2012 Conference. The proposal in 2012 was to have a program fully integrated with the ICAR conference and therefore it took a different format from previous years: the business meetings were shorter and the Open Meeting was only one day, but two additional sessions were organized jointly with ICAR/Interbeef. The overall experience was considered very positive by the Steering Committee (SC), with the only reservation being that longer business meetings would be desirable to stimulate more interaction with and among Interbull customers and collaborators. Several important issues were debated and key decisions were made.

### *Interbull strategic planning meeting - Uppsala, Sweden, January 7-8, 2013*

The Interbull Steering Committee held a two day strategic planning meeting in Uppsala, in which also members of the Interbull Scientific Advisory Committee (SAC) and of the ICAR Executive Board participated. The strategic planning session was very comprehensive and yielded a structured framework to guide Interbull for the next three years. Jarmo Juga, from University of Helsinki, acted as facilitator and his contribution is greatly appreciated. Detailed information about the outcomes from the meeting will be presented and discussed at the 2013 Business Meeting in Nantes, France.

### *Interbeef Working Group Meetings*

The Interbeef working group met in three occasions during the period covered by this report:

- May 28, 2012, during the ICAR meetings in Cork, Ireland.
- January 17, 2013, at the Radisson Blu Hotel, Stansted airport, England.
- May 28, 2013, at the 2013 ICAR meetings in Aarhus, Denmark.

The Interbeef Technical Committee met two times:

- December 6-7, 2013, at SLU, in Uppsala, Sweden.
- May 27, 2013, at the 2013 ICAR meetings in Aarhus, Denmark.

## Information activities

The Interbull Centre carried out two online surveys: a) customer feedback of desired Interbull services and b) file exchange formats. Results will be presented on the 2013 Interbull business meeting in Nantes, France.

The Interbull website has been routinely updated with service information, Interbull events details, institutional facts and news. There are more than 1400 subscribers to the Interbull newsletter who receive regular updates by email. The page will be completely rebuilt using a different platform that allows a more comprehensive integration between the home page, the IDEA interface and the Wiki pages used by the Interbull Centre staff for documentation. The expected migration to the new platform should happen before the end of 2013.

The Interbull Centre director, João Dürr, participated as invited speaker in the following events:

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Event	Host	Place	Time	Title
Workshop on Animal Improvement	ABLN	Póvoa de Varzim, Portugal	July 2012	Interbull: Impact of the international bull evaluations in Portugal and the world
Seminar	Bos-Genetic A.I. Station & Holstein Association	Martonvásár, Hungary	October 2012	Interbull in the era of genomics
Technical workshop on Genomic Selection for Italian Breeders	ANAFI	Cremona, Italy	February 2013	Integration of genomics into dairy international genetic evaluations
UNCEIA General Assembly	UNCEIA	St. Malo, France	February 2013	Perspectives of international genetic evaluations

## 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 2012.

### MS-trend validation

Research collaboration between the Interbull Centre, MTT and NAV has been ongoing with three main topics to be addressed: 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. Anna-Maria Tyrisevä presented the first results of the MS-trend validation project in Cork and will be presenting results about the effect of genomic pre-selection at the Interbull Open Meeting in Nantes.

### MACE robust to bias in trends

Research collaboration between INRA, Institute de l'Élevage and Interbull Centre has been studying the impact on international breeding values of using a MACE model robust to bias in trends of national genetic evaluations. The fixed country effect of the MACE model was replaced by a country x year interaction. The new model has so far been applied to five different traits (pro, dlo, cc1, ude, sta) and first results will be presented during the Interbull Open Meeting in Nantes.

### Cooperation with the World Guernsey Cattle Federation

Continuing a long partnership, the WGCF has requested the development of an inbreeding monitoring service for the breed as a whole. An initial study was carried out with the existing pedigrees in IDEA and results are under analysis by the WGCF. During the WGCF conference in July 2013, a broader request for an international information portal for the breed was designed and a formal proposal is currently being elaborated.

### 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).

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

## PUBLICATIONS

### Interbull publications:

Interbull Bulletin No. 44. Proceedings from the Interbull Technical Workshop, Cork, Ireland May 28-June 1, 2012.

### Publications Interbull Centre staff as authors or co-authors:

- Ansin, E., Liljedahl, L.-E. & Jorjani, H. 2012. Epigenetic studies of the ageing process. 2012 Interbull Meeting, Cork, Ireland, May 28-31, 2012. *Interbull Bulletin* 46, 6 pp.
- Battagin, M., Forabosco, F., Jakobsen, J.H., Penasa, M., Lawlor, T. & Cassandro M. 2012. International genetic evaluation of Holstein bulls for overall type traits and body condition score. *J. Dairy Sci.* 95, 4721–4731.
- Carlström, C., Pettersson, G., Johansson, K., Strandberg, E., Stålhammar, H. & Philipsson, J. 2013. Feasibility of using automatic milking system data from commercial herds for genetic analysis of milkability. *J. Dairy Sci.* – Accepted.
- Dürr, J. & Philipsson, J. 2012. International cooperation: The pathway for cattle genomics. *Animal Frontiers* 2:1, 16-21.
- Dürr, J.W., Forabosco, F., Jakobsen, J. & Zumbach, B. 2012. Interbull survey on sequencing of cattle. *Interbull Bulletin* 44, 5 pp.
- Dürr, J. W., Forabosco, F., Jakobsen, J. & Zumbach, B. 2012. Interbull survey on parentage verification. *Interbull Bulletin* 44, 4 pp.
- Fikse, W.F., Rönnegård, L., Mulder, H.A. & Strandberg, E. 2012. Genome-wide association study for genetic heterogeneity for milk yield and somatic cell score. 63rd Annual Meeting of the EAAP, Bratislava, Slovakia, August 26-31, 2012. Book of Abstracts, p. 239.
- Franzén, J., Thorburn, D., Urioste, J.I. & Strandberg, E. 2012. Genetic evaluation of mastitis liability and recovery using transition probabilities. 63rd Annual Meeting of the EAAP, Bratislava, Slovakia, August 26-31, 2012. Book of Abstracts, p. 91.
- Franzén, J., Thorburn, D., Urioste, J.I. & Strandberg, E. 2012. Genetic evaluation of mastitis liability and recovery through longitudinal analysis of transition probabilities. *Genetics, Selection, Evolution* 44:10.
- Jakobsen, J.H. & Dürr, J.W. 2012. Implementing a Sire-Dam Pedigree Structure in MACE. 2012 Interbull Technical Workshop, Verona, Italy, February 2-3, 2012. *Interbull Bulletin* 45, 6 pp.
- Jakobsen, J. H. & Sullivan, P. G. 2012. Robust GMACE for young bulls – application to data. *Interbull Bulletin* 45, 8-12.
- Jakobsen, J. H. & Sullivan, P. G. 2013. International genomic evaluation of young Holstein bulls ADSA-ASAS joint annual meeting July 8-12, Indianapolis, Indiana.
- Johansson, H., Johansson, K. & Jakobsen, J. 2012. Genotype by environment interactions of claw health in Swedish dairy cattle in tie stalls and loose-housing. Proceedings of the AnGR-NordicNET Workshop. 7th-8th of November, 2012, Tuusula, Finland.
- Jorjani, H., Jakobsen, J., Nilforooshan, M.A., Hjerpe, E., Zumbach, B., Palucci, V. & Dürr, J. 2012. Genomic Evaluation of BSW Populations. InterGenomics: Results and Deliverables. *Interbull Bulletin* 43, 5-8.

- Jorjani, H., Jakobsen, J., Hjerpe, E., Palucci, V. & Dürr, J. 2012. Status of Genomic Evaluation in the Brown Swiss Populations. *Interbull Bulletin* 46, 46-54.
- Mulder, H.A., Rönnegård, L., Fikse, W.F., Veerkamp, R.F. & Strandberg, E. 2013. Estimation of genetic variance for macro- and micro-environmental sensitivity using double hierarchical generalized linear models. *Journal: Genetics Selection Evolution* Accepted.
- Patry, C., Jorjani, H. & Ducrocq, V. 2013. Effects of national genomic preselection on the international genetic evaluations. *Journal of Dairy Science*. 96, 3272-3284.
- Philipsson, J. 2012. Interbull developments, global genetic trends and role in the era of genomics. *Interbull Bulletin* 44, i-xiii.
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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:

2013	December 3
2014	April 8
	August 12
	December 2

The decision about a turnaround time of two or three weeks from data reception to official release will be taken during the Nantes meeting as part of the GMACE service policy.

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

2013	September
2014	January
	September
2015	January
	September

### Research and Development

**Table 3** - Summary of current and planned research and development activities at the Interbull Centre.

Project	Current Stage
Interbull Centre Database	Ongoing, partially implemented
MS-trend validation	Results to be presented in Nantes
Robust GMACE	Implementation run took place in August 2013
Truncated MACE	Business plan to be presented in Nantes
Genomic data repository	Business plan to be presented in Nantes
Change in left censoring of data for MACE	January 2014 test run
Nature of genetic correlations	Anne's Loberg PhD thesis, ongoing
Guernsey Information Portal	Proposal under discussion
Robust MACE	Ongoing. First results to be presented at the Open meeting in _Nantes

### Meetings

The 2013 Interbull meeting, in conjunction with the 64<sup>th</sup> Annual EAAP Meeting in Nantes, France, August 23-25, 2013.

The 2014 Interbull Meeting, in conjunction with the 39<sup>th</sup> ICAR Session and the IDF/ISO Analytical Week. Berlin, Germany, May 20 to 21, 2014.

The 2015 Interbull meeting will precede the 2015 ADSA®-ASAS Joint Annual Meeting. Orlando, Florida, USA, July 9 to 12, 2015.

### **Planned Publications**

Interbull Bulletin No. 47. Proceedings of the Interbull Open Meeting, Nantes, France, August 23 to August 26, 2013.

## Appendix I

### INTERBULL CENTRE FINANCES AND BUDGETS, August 2013

#### *Comments to accounts and budgets*

The financial situation of the Interbull Centre is presented in Appendix II. The budgets and financial reports follow exactly the same format adopted in the 2011-2012 annual report. 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 2012 in comparison with the accounts for 2011 and the budget for 2013. A prognosis for 2014 is made according to the expectations as of August 2013.

#### *Accounts for 2012*

The result for 2012 showed a recovery on the Interbull Centre finances compared with the significant deficit observed in 2011. The final balance was of € 42,281 (item 20), practically the same value of the accumulated deficit from 2011. The main reason for the improvement was the adoption of the service fees approved in the Stavanger meeting.

Some important differences between the budget and the actual accounts for 2012 are observed. Budgeted service fees (item 1) were based on a different proposal for the new fees than the one finally approved and applied (slightly lower). The main differences are, however, in the costs. Because the budget for 2012 was prepared following the old format, items 9 and 10 were not budgeted separately, but included as part of the overheads (18). Yet the costs with items 9 and 10 ended up being much larger than the extra overheads budgeted. Outsourced activities (item 17) in the actual accounts also exceeded the budget, mainly because the consultancy of Gerald Jansen went from part time to full time in 2012. The miscellaneous (item 16) also increased beyond expected, mainly due to losses in exchange rates. In order to compensate for the increased costs, practically no investment in computing resources was made in 2012.

Outsourced activities included computation of MACE for conformation traits by the North-American consortium, Gerald Jansen's consultancy and the research agreement to develop a Mendelian sampling validation procedure with MTT and NAV. ICAR has taken some costs for publication according to earlier commitment, approximately of the same size as the fee to ICAR. Interbull membership fees to ICAR 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 € 7,483 in 2012 from service fees to cover these costs.

In total 32 countries participate in the Interbull evaluations in 2012 and the service fees per trait group were as follows (with figures for 2011 within parenthesis)<sup>2</sup>: production € 387389 (340,685), conformation € 92,678 (89,175), udder health € 52,618 (50,117), longevity € 39,722 (38,571), calving traits € 31,415 (29,015), female fertility € 54,494 (52,758) and workability traits € 7,044 (6,494),

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<sup>2</sup> These totals are obtained by summing up the nominal values printed in the service invoices, while in the item 1 of Appendix II (Service fees) it is reported the actual sum of payments received in SLU's official accounts after applying the currency exchange rate SEK:€. This is the explanation for the differences in the totals.

adding up to € 665,360 (606,815). The large increase verified € 58,545 (9.6%) is mainly due to the adjustment in the service fees implemented in 2012, raising the basic fee from € 3,000 to € 4,000 and consequently having cumulative impact on all trait groups fees. Additionally, two new countries joined the services in December 2012, Argentina and Uruguay, and a significant number of populations added new trait groups to the services demanded from Interbull. Besides the MACE evaluation fees, a new category of fee was adopted in 2012 referring to the GEBV validation test. This fee was set to be 20% of the value for the production traits fee and amounted to € 49,830.

The Intergenomics invoices issued in 2011 were received in 2012, while some Intergenomics invoices referring to 2012 were either paid in 2013 or still pending.

Research grants in 2012, reached the budgeted levels. SLU has increased its contribution to the Interbull Centre to the historical levels (~ SEK 600,000), after a decrease in 2011. The EU commission has continued its support of the Interbull Centre with € 150 000, as well as the World Guernsey Cattle Federation has continue its valuable support with £5000.

As a general comment, one could say that the 2012 budget overestimated the incomes and underestimated important costs, such as other personnel expenses and office rent (items 9 and 19), but the overall result was significantly positive.

### *Prognosis for 2013*

For 2013 (projected in August 2013) the financial prognosis indicates a deficit of € 20,234, which is lower than what was budgeted in May 2012 (€ 33,439). This is mainly due to an increase in the expected service fees and an expected decrease in computer costs.

The projected incomes are very similar to the budgeted values. The fee for the GEBV validation test, however, was reduced from 20% of the production traits fees in 2012 to 15% of the same value. This reduction is part of the proposal to add new service fees for the GMACE services already in 2013. As these new service fees have not been approved yet, they were not added to the projected result for 2013. Since the regular annual invoices for 2013 had to be sent in June, it was decided to charge the proposed 15% for the GEBV validation test fee instead of the currently agreed 20% and make eventual repairs when a definite policy for the GMACE fees is adopted. In case the new fee is implemented as expected, the deficit in 2013 will not occur.

Service fees per trait group for 2013 were invoiced as follows: Production traits € 389,001, conformation € 100,241, udder health € 55,264, longevity € 42,321, calving traits € 34,322, female fertility € 57,724, workability traits € 8,900 and the GEBV validation test € 42,151. In total 32 countries participate in the Interbull evaluations during 2013 and the total service fees sum up to € 729,923.

Costs in 2013 are expected to be in close agreement to the budget presented in May 2012.

### *Budget for 2014*

For 2014, all incomes are assumed to stay the same as in 2013, except for a 2.5% increase in service fees to account for the historical annual increase in population-trait groups participating in the international evaluations. The level of the EU contribution is expected to continue, as well as the continued support by SLU and WGCF.

The salary costs are higher than for 2012 because of regular salary increases and all other costs are assumed to follow the same pattern as in 2013, except from the outsourced activities, since the contract with the North-American consortium for computation of MACE for conformation traits will finish at the end of 2013, Gerald Jansen's consultancy is not expected to continue in 2014 and the research agreement with MTT and NAV also ends in December 2013. It is proposed to hire an IT company to provide support to the IDEA database developments and this is what is represented in the 2014 budget as predicted in August 2013<sup>3</sup> (item 17).

Once the fee structure for GMACE is defined, the proposed budget will have to be reviewed not only regarding incomes, but also in salaries and related costs, since the implementation of GMACE implies additional resources at the Interbull Centre.

### *Interbeef*

The specific budget for Interbeef is shown on Appendix IV. The Interbeef working group has established a new service/research agreement in 2012, and the Interbull Centre is once again contracted to be the operational unit. Management of the finances will follow a different model than Interbull, being under the responsibility of Service ICAR instead of the Interbull Centre. Service fees are therefore not defined/handled by the Interbull Centre, which instead invoices Service ICAR for the full year for a value agreed on € 100 000 for 2012 and 2013. For this reason, the Interbeef income and costs are included in the overall budget of the Interbull Centre.

In 2012, the Interbull Centre accepted a request from ICAR to reduce the budgeted service fee due to the fact that the apportionment among users did not cover the full amount. It was agreed that the Interbull Centre could not accept the same situation in the future, as the resources required by the Interbeef activities are being allocated as planned.

Among the costs related to the Interbeef operation (Appendix IV) salaries in 2012 and in the budget for 2013 were estimated as being 20% of the center's director salary and 30% of two scientists from the service team, which are directly involved with data reception, programming, genetic evaluations and data preparation for research partners. In the projected result for 2013 and in the budget for 2014, these proportions were changed to 15% of the center's director salary, 10% of staff 1 salary, 25% of staff 2 salary and 30% staff 3 salary, which kept the same number of hours dedicated to the project but reflects better the actual situation. The other costs are either a function of the salaries or a proportion of the total budget.

### **INTERBULL CENTRE FINANCES AND BUDGETS, December 2013**

During the meetings in Nantes (August 2013), the Steering Committee (SC) requested the Interbull Centre to present a new proposal to fund the additional services represented by the GMACE evaluations. It was agreed that GMACE and MACE should be considered as part of a unique international evaluation system and not as two different systems with separate budgets and fee structures. This decision was based on the feedback received during the business meetings, summarized in the executive summary of September 16, 2013

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<sup>3</sup> After the discussions in Nantes, it was decided to hire a programmer instead of an IT company, and this is reflected on the 2014 budget proposed in December 2013.

([https://wiki.interbull.org/public/ExSum\\_Sep2013?action=print](https://wiki.interbull.org/public/ExSum_Sep2013?action=print)), which indicated that most service users support that Interbull should offer a service comparing genomically proven young bulls as an extension of the current MACE evaluations to compare progeny tested bulls AND that all service users should contribute financially to maintain the services regardless of providing GEBVs to Interbull or not, given that all will receive GMACE results in their respective scale.

**Updated service fees for 2014**

The SC therefore approved an average increase of 11% on the 2014 total service fees by increasing the variable fees per 1000 cows by 17% (Table Ia) and maintaining the basic fee (€ 4 000) and the relative weight given to each additional trait group (Table Ib) as they currently are. Smaller populations are less impacted than larger populations and countries participating with data in GMACE have a larger increase than others. The total increment in service fees would be of € 82 843. The SC will re-discuss the fee structure in the 2014 annual meeting in Berlin, after receiving the feedback from the business meeting.

**Table Ia.** Calculation of the Interbull annual fee for participation in services and MACE evaluation of production traits.

		Current	Proposed (17% increase in variable fees)
		4 000.00	4 000.00
Variable fee (€), per 1 000 recorded cows	Basic fee (€)		
	≤ 100	42.00	49.00
	101 to 300	16.00	18.70
	301 to 1 000	6.00	7.00
	1 001 to 2 400	4.00	4.70
	> 2 400	0.20	0.25

**Table Ib.** Fee per service category expressed as a proportion of the fee for production traits.

Production	Conformation	Udder Health	Longevity	Calving	Female Fertility	Workability	GEBV test
1.00	0.30	0.15	0.15	0.15	0.20	0.05	0.15

**Updated 2014 budget**

Additionally, the SC requested the Interbull Centre to review the budgets presented in Nantes in order to alter the following items:

- Adjust the service fees according to the above mentioned fee update.
- Update the salaries & social costs to reflect the changes in personnel at the Interbull Centre.
- Update the outsourced activities to include the prolongation of Gerald Jansen’s consultancy and to include the costs referring to a new research agreement between CDN for development and operationalization of GMACE evaluations.
- Create an exclusive table for Interbull budgets and financial reports (Appendix III).

After the modifications, the SC approved the annual financial reports and budgets of the Interbull Centre in December 2013.

## Interbull Centre Activity Report 2012/2013

August 14, 2013

### Appendix II

#### Interbull Centre (Interbull + Interbeef) overall Finances and Budgets (€), December 2013

	2011		2012		2013		2014	
	Actual Account (Dec 11)	Budget (Aug 11)	Actual Account (Dec 12)	Budget (May 12)	Projected result (Aug 13)	Proposed budget (Aug 13)	Proposed budget (Dec 13)	
<b>Income</b>								
1)	Service fees <sup>a</sup>	607 138	738 085	727 961	715 193	729 923	748 171	809 558
2)	SLU grants	33 305	60 250	72 941	66 445	69 045	69 045	69 045
3)	WGCF grant <sup>b</sup>	6 091	5 750	9 808	5 750	5 800	5 800	5 800
4)	Intergenomics <sup>c</sup>	0	30 000	53 552	30 000	36 448	30 000	30 000
5)	EU grants <sup>d</sup>	150 000	150 000	150 791	150 000	150 000	150 000	150 000
6)	Interbeef	0	100 000	93 303	100 000	100 000	100 000	100 000
<b>7)</b>	<b>Total:</b>	<b>796 534</b>	<b>1 084 085</b>	<b>1 108 355</b>	<b>1 067 388</b>	<b>1 091 216</b>	<b>1 103 016</b>	<b>1 164 403</b>
<b>Costs</b>								
8)	Salaries + social costs	511 731	556 000	555 555	568 332	586 340	591 801	630 030
9)	Other personnel expenses <sup>e</sup>	26 611		27 849	28 417	29 317	29 590	31 502
10)	Office rent <sup>f</sup>	76 769		83 333	85 250	87 951	88 770	111 305
11)	Computer costs	3 556	55 000	2 338	55 000	40 000	40 000	40 000
12)	Travels, conferences, training	33 573	40 000	36 652	40 000	40 000	40 000	40 000
13)	Publications	5 330	3 000	7 855	3 000	3 000	3 000	3 000
14)	Phone, fax, post	4 580	5 000	4 359	5 000	5 000	5 000	5 000
15)	ICAR	6 934	6 930	7 483	6 930	7 000	7 000	7 000
16)	Miscellaneous	16 043	10 000	36 058	10 000	10 000	10 000	10 000
17)	Outsourced activities <sup>g</sup>	134 466	103 000	119 037	111 350	109 350	70 000	33 700
18)	Overheads <sup>h</sup>	168 871	195 000	185 555	187 549	193 492	195 294	207 910
<b>19)</b>	<b>Total:</b>	<b>988 464</b>	<b>973 930</b>	<b>1 066 075</b>	<b>1 100 827</b>	<b>1 111 451</b>	<b>1 080 456</b>	<b>1 119 447</b>
20)	Balance	-191 930	110 155	42 281	-33 439	-20 234	22 560	44 956
21)	Accum. Balance:	-42 057	68 098	223	-33 216	-20 011	2 549	24 945
22)	Exchange rate (SEK:€)	8.91	9.12	8.62	8.97	8.69	8.69	9.03

a. Updated MACE, GMACE and GEBV test fees approved by the Steering Committee in December 2013

b. £5000

c. 2011 fees were invoiced in 2012; outstanding fees from 2012 to be received in 2013.

d. The Interbull Centre holds the status of European Union Reference Laboratory for Zootechnics (96/463/EC: Council Decision of 23 July 1996)

e. Other personnel expenses include travel allowances, expenses with people not employed by SLU, medical expenses, etc.

f. In June 2014, the Interbull Centre will move to new facilities and office rents are expected to increase

g. 2014: Gerald Jansen's consultancy (400 h); research agreement with CDN for GMACE development (440 h)

h. 15%, 5% and 13% (multiplied by item 8) for the university, faculty and department levels, respectively

## Interbull Centre Activity Report 2012/2013

August 14, 2013

### Appendix III

#### Interbull specific Finances and Budgets (€), December 2013

		2011	2012		2013		2014	
		Actual Account	Budget	Actual Account	Budget	Projected result	Proposed budget	
		(Dec 11)	(Aug 11)	(Dec 12)	(May 12)	(Aug 13)	(Aug 13)	(Dec 13)
<b>Income</b>								
1)	Service fees <sup>a</sup>	607 138	738 085	727 961	715 193	729 923	748 171	809 558
2)	SLU grants	33 305	60 250	72 941	66 445	69 045	69 045	69 045
3)	WGCF grant <sup>b</sup>	6 091	5 750	9 808	5 750	5 800	5 800	5 800
4)	Intergenomics <sup>c</sup>	0	30 000	53 552	30 000	36 448	30 000	30 000
5)	EU grants <sup>d</sup>	150 000	150 000	150 791	150 000	150 000	150 000	150 000
<b>7)</b>	<b>Total:</b>	<b>796 534</b>	<b>984 085</b>	<b>1 015 052</b>	<b>967 388</b>	<b>991 216</b>	<b>1 003 016</b>	<b>1 064 403</b>
<b>Costs</b>								
8)	Salaries + social costs	511 731	497 561	497 115	507 315	525 324	532 071	570 300
9)	Other personnel expenses <sup>e</sup>	26 611		24 856	25 366	26 266	26 604	28 515
10)	Office rent <sup>f</sup>	76 769		74 567	76 097	78 799	79 811	102 346
11)	Computer costs	3 556	49 500	2 141	49 500	36 334	36 374	36 374
12)	Travels, conferences, training	33 573	36 000	33 567	36 000	36 334	36 374	36 374
13)	Publications	5 330	2 700	7 194	2 700	2 725	2 728	2 728
14)	Phone, fax, post	4 580	4 500	3 992	4 500	4 542	4 547	4 547
15)	ICAR	6 934	6 930	7 483	6 930	7 000	7 000	7 000
16)	Miscellaneous	16 043	9 000	33 022	9 000	9 084	9 093	9 093
17)	Outsourced activities <sup>g</sup>	134 466	103 000	119 037	111 350	109 350	70 000	33 700
18)	Overheads <sup>h</sup>	168 871	164 027	164 048	167 414	173 357	175 584	188 199
<b>19)</b>	<b>Total:</b>	<b>988 464</b>	<b>873 218</b>	<b>967 023</b>	<b>996 172</b>	<b>1 009 115</b>	<b>980 185</b>	<b>1 019 175</b>
20)	Balance	-191 930	110 867	48 029	-28 784	-17 898	22 832	45 228
21)	Accum. Balance:	-42 057	68 810	5 972	-22 812	-20 011	2 821	25 217

a. Updated MACE, GMACE and GEBV test fees approved by the Steering Committee in December 2013

b. £5000

c. 2011 fees were invoiced in 2012; outstanding fees from 2012 to be received in 2013.

d. The Interbull Centre holds the status of European Union Reference Laboratory for Zootechnics (96/463/EC: Council Decision of 23 July 1996)

e. Other personnel expenses include travel allowances, expenses with people not employed by SLU, medical expenses, etc.

f. In June 2014, the Interbull Centre will move to new facilities and office rents are expected to increase

g. 2014: Gerald Jansen's consultancy (400 h); research agreement with CDN for GMACE development (440 h)

h. 15%, 5% and 13% (multiplied by item 8) for the university, faculty and department levels, respectively

## Appendix IV

### Interbeef specific Finances and Budgets (€), December 2013

These budgets are extracted from the overall budget for the Interbull Centre (Appendix II) to illustrate to the Interbeef service users how the incoming service fees will be spent.

		2012		2013		2014
		Budget (May 12)	Actual Account (Dec 12)	Budget (May 12)	Projected result (Aug 13)	Budget (Dec 13)
<b>Income</b>						
1)	Service fees	100 000	93 303	100 000	100 000	100 000
<b>2)</b>	<b>Total:</b>	<b>100 000</b>	<b>93 303</b>	<b>100 000</b>	<b>100 000</b>	<b>100 000</b>
3)	<i>(% of total income – Appendix II)</i>	10.0%	8.4%	10.0%	9.2%	9.1%
<b>Costs</b>						
4)	Salaries + social costs <sup>a</sup>	58 439	58 439	61 017	61 017	59 730
5)	Other personnel expenses <sup>b</sup>	2 922	2 922	3 051	3 051	2 987
6)	Rents <sup>c</sup>	8 766	8 766	9 152	9 152	8 960
7)	Computer costs <sup>d</sup>	5 500	197	5 500	3 666	3 626
8)	Travels, conferences, training <sup>d</sup>	4 000	3 085	4 000	3 666	3 626
9)	Publications <sup>d</sup>	300	661	300	275	272
10)	Phone, fax, post <sup>d</sup>	500	367	500	458	453
11)	Miscellaneous <sup>d</sup>	1 000	3 035	1 000	916	907
12)	Overheads <sup>e</sup>	19 285	19 285	20 135	20 135	19 711
<b>13)</b>	<b>Total:</b>	<b>100 712</b>	<b>96 758</b>	<b>104 655</b>	<b>102 336</b>	<b>100 272</b>
14)	<i>Balance:</i>	-712	-3 455	-4 655	-2 336	-272
15)	<i>Accum. Balance:</i>	-712	-3 455	-8 111	-5 791	-6 063

a. 2012 and budget 2013: 20% manager + 30% staff 1 + 30% staff 2; projected 2013 and budget 2014: 15% manager + 10% staff 1 + 25% staff 2 + 30% staff 3

b. 5% of salaries

c. 15% of salaries

d. % of total budget in line 3

e. 33% of salaries