

**Interbull Centre  
Activity Report**



**August 2017 -  
January 2018**



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# INTERBULL CENTRE

## ACTIVITY REPORT AUGUST 2017 – JANUARY 2018<sup>1</sup>

### INTERBULL CENTRE

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Swedish University of  
Agricultural Sciences

*The Interbull Centre is the operational unit of the ICAR permanent sub-committee Interbull.*



*The Interbull Centre holds the status of European Union Reference Laboratory (EURL) for Zootecnics (Bovine Breeding).*



*The Interbull Centre is ISO 9001:2015 certified.*



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<sup>1</sup> Presented at the 2018 Interbull Meeting, Auckland, New Zealand, February 2018



# INTERBULL CENTRE ACTIVITY REPORT

## AUGUST 2017 – JANUARY 2018

**Toine Roozen, Valentina Palucci, Hossein Jorjani, Haifa Benhajali, Eva Hjerpe, Joanna Sendecka, Marcus Pedersén, Carl Wasserman, Hans Persson, Renzo Bonifazi.**

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**inter**  **genomics**

**GEN**  **EX**  
International Genotype Exchange Platform



## INTRODUCTION

The Interbull Centre is a section of the Department of Animal Breeding and Genetics (HGEN) 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 (EURL-Z), and is the designated European Union Reference Centre for Zootechnics (Bovine Breeding) from 1 November 2018. For a more detailed description of our governance, infrastructure and services, I would like to refer you to the special issue of the Interbull Bulletin (No. 52<sup>2</sup>, 2018) about the Interbull Centre.

This Report describes the activities at the Interbull Centre between 15 August 2017 and 31 January 2018. During this period our routine activities for genetic and genomic evaluations have taken place as usual. As the time span between the 2017 and 2018 Annual Meetings is less than 6 months, this report is also briefer than in recent years.

Toine Roozen,

Interbull Centre Director

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<sup>2</sup> <https://journal.interbull.org/index.php/ib/article/view/1438>

# 1. PEOPLE

## 1.1. Interbull Centre Personnel

Interbull Centre staff are employed by the Department of Animal Breeding and Genetics (HGEN) of the Swedish University of Agricultural Sciences (SLU), and consists (January 2018) of:

- Toine Roozen (MSc, MBA), Director
- Hossein Jorjani (DVM, PhD, Professor), Senior Genetic Data Analyst, Service Manager
- Haifa Benhajali (PhD), Genetic Data Analyst - Genetics
- Eva Hjerpe (MSc), Genetic Data Analyst - Genetics
- Valentina Palucci (MSc), Genetic Data Analyst - Genetics, Quality Manager
- Joanna Sendeka (PhD), Genetic Data Analyst - Genetics
- Marcus Pedersén, Genetic Data Analyst – IT; Systems Administrator
- Carl Wasserman, Genetic Data Analyst – IT; Systems Developer, IT Coordinator
- Renzo Bonifazi MSc – Genetic Data Analyst - Genetics
- Hans Persson, Genetic Data Analyst – IT; Systems Administrator

In addition, the following SLU members of staff have part-time responsibilities at Interbull Centre:

- Louise Simann (BA), Administrator
- Monica Jansson – Interbull Bulletin
- Cano Merkan – IT Coordinator / Systems Analyst

### New recruits

**Renzo Bonifazi** completed his BSc in Animal Productions and his MSc in Animal Science at the University of Perugia (Italy), based on thesis work carried out while completing a traineeship at the Interbull Centre in 2016, with the title “Reliability in worldwide genomic evaluations of dairy cattle populations”. Upon completion of his MSc he returned to the Interbull Centre in May 2017 for a post-degree traineeship on beef evaluations and since October 2017 he is employed at the Interbull Centre. His main activities are related to genetic data analysis of Interbeef evaluations using MiX99 (LUKE) software for Variance Component Estimation.

**Hans Persson** started working at the Interbull Centre on 1 December 2017. Hans is an Electronics engineer BSc specialized on software. He has previously been working with embedded systems development at a network infrastructure company. Over the years Hans has gathered experience with computers by working with anything from production of computers, service support to testing and development. At the Interbull Centre, Hans is working on the development of the software services and the maintenance of servers.

## 1.2. Professor Lawrence (Larry) R. Schaeffer – Doctor Honoraris Causa

At the 2017 promotional celebrations at the Swedish University of Agricultural Sciences (SLU), Professor Larry Schaeffer was appointed as Honorary Doctor of Agricultural Science at the Faculty of Veterinary Medicine and Animal Science. This honorary title is awarded to someone who has made outstanding scientific efforts for the university, where the Interbull Centre is housed. Ever since its first International Evaluation in 1995, Interbull uses Professor Larry Schaeffer’s method known as **M**ulti-Trait **A**cross **C**ountry **E**valuation (MACE) to calculate International Genetic Evaluations.

The Interbull “Hall of Fame” includes an impression with photos and video links of his Honorary Doctoral Lecture ‘A story of Genetics’, the promotional ceremony, celebratory dinner in Uppsala Castle and meetings and lectures with the Department of Animal Breeding and Genetics, and the Interbull Centre, which all took place between 5 and 12 October 2017.

### 1.3. Training, Courses, Meetings and Conferences

Staff was involved with the following courses, meetings and conferences during this period:

<b>Training Courses provided:</b>	<b>Location</b>	<b>Dates</b>	<b>Person*</b>
HGEN seminar	Uppsala, Sweden	12 October 2017	Dr Lawrence (Larry) Schaeffer*
Seminar in International breeding evaluation during course in Cattle production	Uppsala, Sweden	30 January 2018	Valentina Palucci*
<b>Conferences/meetings attended:</b>			
Interbull Annual Meeting (incl. ITC, SC, Open, Business and joint-EAAP)	Tallinn, Estonia	25-28 August 2017	Toine Roozen*, Hossein Jorjani*, Valentina Palucci, Haifa Benhajali*, Joanna Sendeck, Eva Hjerpe, Carl Wasserman, Renzo Bonifazi*
InterGenomics-Holstein Meeting	Tallinn, Estonia	29 August 2017	Toine Roozen*, Hossein Jorjani*, Valentina Palucci, Joanna Sendeck
ReDiverse Meeting	Tallinn, Estonia	29 August 2017	Toine Roozen
PyCon Sweden (Swedish Python conference)	Stockholm, Sweden	6 September 2017	Carl Wasserman, Marcus Pedersén
European Holstein and Red Holstein Conference and General Assembly	Budapest, Hungary	18-20 September 2017	Toine Roozen*
Iranian Delegation	Uppsala, Sweden	23 October 2017	Toine Roozen*, Hossein Jorjani*
Meeting with LUKE regarding MiX99, VCE	Finland	30 October – 3 November 2017	Renzo Bonifazi
Open Source Summit, Europe	Prague, Czech Rep.	23-26 October 2017	Marcus Pedersén
SNPMace Kick off meeting with Mike Goddard	Uppsala, Sweden	13-14 November 2017	Toine Roozen, Hossein Jorjani, Valentina Palucci, Haifa Benhajali
ISO surveillance Audit	Uppsala, Sweden	28-29 November 2017	Toine Roozen, Hossein Jorjani, Valentina Palucci, Haifa Benhajali, Joanna Sendeck, Eva Hjerpe, Carl Wasserman, Marcus Pedersén
Seminar on evolution and challenges in Animal Breeding and Genetics in the last four decades	Uppsala, Sweden	30 November and 1 December 2017	Toine Roozen (30 Nov only), Hossein Jorjani*, Valentina Palucci, Haifa Benhajali, Joanna Sendeck, Eva Hjerpe, Renzo Bonifazi
European Union Reference Centres Directors Meeting	Brussels, Belgium	1 December 2017	Toine Roozen
Scandinavian Quality Conference 2018	Göteborg, Sweden	18 January 2018	Valentina Palucci
<b>Committee Meetings:</b>			
Steering Committee	Tallinn, Estonia	25, 27 August 2017	Toine Roozen, Hossein Jorjani, Valentina Palucci
Steering Committee	Conference calls	24 October 2017 13 December 2017 23 January 2018	Toine Roozen, Hossein Jorjani, Valentina Palucci
Technical Committee	Tallinn, Estonia	25, 27 August 2017	Toine Roozen, Hossein Jorjani, Valentina Palucci, Haifa Benhajali, Joanna Sendeck, Eva Hjerpe, Renzo Bonifazi
Technical Committee	Conference call	31 October 2017	Hossein Jorjani, Valentina Palucci, Joana Sendeck

\* People indicated with ‘\*’ provided a presentation.



## 1.4. Consultants and Suppliers

Through consultancy agreements with the Canadian Dairy Network (CDN) and the Irish Cattle Breeding Federation (ICBF), we have a good collaboration with:

- **Dr Pete Sullivan** (CDN, Canada): works as a part time consultant (25%), mainly on GMACE related issues.
- **Dr Thierry Pabiou** (ICBF, Ireland): supplies international genetic correlations for Adjusted Weaning Weight (AWW) for Interbeef evaluations to the Interbull Centre.

**Jan Erik Strömqvist** joined the Interbull Centre on 15 January 2018 as a trainee, optimising software in use at the Interbull Centre. This will include further streamlining of some processes, and conversion of Fortran/Bash/SAS software to “Python”.

## 1.5. Visitors

We like to thank all our visitors for taking the time to visit us in Uppsala, which all contribute to productive collaboration.

After his first Erasmus placement with the Interbull Centre in 2016, **Renzo Bonifazi** returned to the Interbull Centre in May 2017 for a second training period (Erasmus post-degree Traineeship), during which he worked on a multi-trait Animal Model for International Beef Evaluations (“AMIBE”), especially looking at Variance Components and genetic correlations using the package MiX99 (Luke, Finland). MiX99 has been tested using data from Interbeef member countries participating to the January 2017 routine evaluation. The optimal criteria to run the program has been defined through different scenarios and using data from 3 populations out of the 8 involved in the international evaluation. Genetic correlations for Adjusted Weaning Weight have been compared with those currently provided by ICBF (Ireland). In order to speed up the program as much as possible, different solutions have been tested. A bivariate analysis approach has been tested as well.

**Erik Kutscher**, an auditor within *Bureau Veritas Certification Sverige AB*, visited the Interbull Centre on 28 and 29 November 2017 to carry out a second surveillance audit including a transition to the new standard SS-EN ISO 9001:2015. The Interbull Centre’s quality management system has been updated with the inclusion of InterGenomics, among the service operations, procedures for handling risks and opportunities and other changes as required by the new standard. Interbull Centre successfully passed the audit and fully upgraded its quality management system to the 2015 standard with a total absence of non-conformities found.

Starting 11 September 2017, two Swedish high school students, **Jacob Olsson** and **Axel Vikander**, spent, as part of their computer studies, two days a week for a total of 10 weeks at the Interbull Centre and were involved mainly in Linux development and administration, i.e. learning and testing how to install, configure and administer Linux systems and specific Linux applications/services like MediaWiki and Gitlab, converting mercurial repositories to git repositories. They had also the opportunity to try some programming in Python.

From 20 September to 20 December 2017 **Matteo Piu**, spent time at the Interbull Centre as part of his BSc studies at the University of Sassari in Italy, working mainly on bending of disparately estimated correlations of the Interbeef population for the trait Adjusted Weaning Weight (aww) using a bivariate approach. During his internship he learnt about Bash and R programming languages.

**Larry Schaeffer** was our guest in Uppsala from 4 until 13 October 2017: Larry was awarded an honorary doctorate at SLU on 7 October 2017. In addition to the official lecture and ceremonies on 5-7 October, his host, Hossein Jorjani, organised a number of additional meetings and lectures for staff at the Interbull Centre and others at the Department of Animal Breeding and Genetics between 9 and 12 October 2017. Larry raised a few ideas of interest to Interbull and offered to provide further details and help with implementing these.



**Reinhard Reents** visited Uppsala on 6 and 7 October 2017 in conjunction with the above ceremonies, and additional meetings were held with the Interbull Centre Director.

On 13 and 14 November 2017 **Mike Goddard** attended the SNPMap Project “Kick-off Meeting” at the Interbull Centre. During the meeting both technical issues (Interbull Centre’s SNPMap activities, Project Plan) and organisational/legal issues were discussed (Agreements, Terms of Reference). Research activities started in January 2018.

On 30 November and 1 December 2017 a “Seminar on evolution and challenges in Animal Breeding and Genetics in the last four decades” was organised at SLU’s Department for Animal Breeding and Genetics to celebrate the 60<sup>th</sup> birthdays of four of its professors (including Interbull Centre’s Hossein Jorjani’s). Hossein had invited **Esa Mäntysaari** as his guest speaker who gave a speech titled “From hoofs and horns to genotypes”, while Hossein presented “Evolution of quantitative genetics theory in the last 100 years”. Ahead of the seminar, Esa Mäntysaari visited the Interbull Centre to discuss a variety of technical issues, including the SNPMap feasibility project.

## 2. SERVICE & OPERATIONS – Interbull Centre

Since the start of international evaluations in 1995, the service portfolio and output at the Interbull Centre has increased significantly; both through expansion of the international genetic evaluations to include new populations and new traits, and through the addition of new items. The figures that are usually reported in this section are mainly based on the April Routine Run. As the current report (August 2017-January 2018) does not include the April Routine Run, such figures are not included. The January 2018 Interbeef Routine Run for the first time included calving traits. As the 2018 Interbull Annual Meeting takes place during this run, no additional figures are available at this stage.

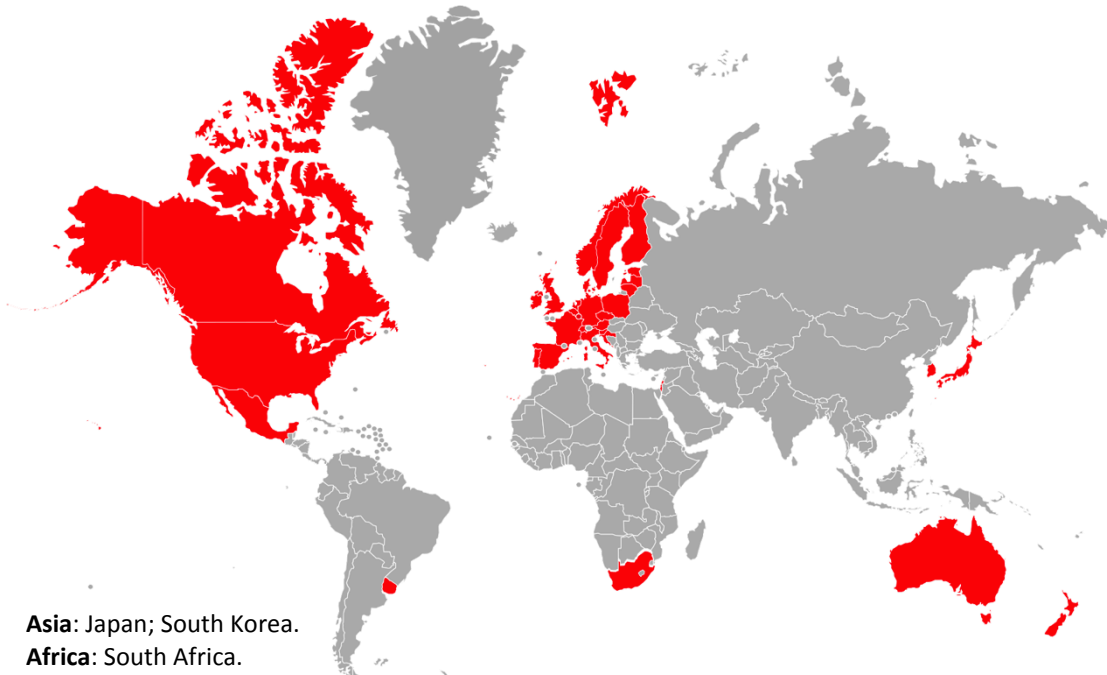
	Multi-Trait Across Country Evaluations (MACE) for progeny tested bulls							Genomic Services			Beef	
1995	PROD											
1999	PROD	CONF										
2001	PROD	CONF	UDDER									
2004	PROD	CONF	UDDER	LONG								
2005	PROD	CONF	UDDER	LONG	CALV							
2007	PROD	CONF	UDDER	LONG	CALV	FERT						
2008	PROD	CONF	UDDER	LONG	CALV	FERT	WORK					
2010	PROD	CONF	UDDER	LONG	CALV	FERT	WORK	GEBV test				
2011	PROD	CONF	UDDER	LONG	CALV	FERT	WORK	GEBV test	IG			
2014	PROD	CONF	UDDER	LONG	CALV	FERT	WORK	GEBV test	IG	GMACE		
2015	PROD	CONF	UDDER	LONG	CALV	FERT	WORK	GEBV test	IG	GMACE	AWW	
2018	PROD	CONF	UDDER	LONG	CALV	FERT	WORK	GEBV test	IG	GMACE	AWW	CALV

PRODUCTION, CONFORMATION, UDDER Health, LONGevity, CALVing Trait, FERTility, WORKability, IG=InterGenomics, GMACE, AWW = InterBeef (AWW=Adjusted Weaning Wt; CALV=Calving Ease, Birth Wt)

Figure 2.1: Development of Interbull Portfolio (January 2018)

The Interbull Centre provides international genetic evaluation services for dairy and beef cattle in 35 countries from 5 continents; Europe: 26 countries; America's: 4; Oceania and Asia 2 each; Africa: 1.

Figure 2.2: Interbull's Global Reach (January 2018)



**Asia:** Japan; South Korea.

**Africa:** South Africa.

**America's:** Canada; Mexico; Uruguay, USA

**Europe:** Austria; Belgium; Croatia; Czech Republic; Denmark; Estonia; Finland; France; Germany; Hungary; Ireland; Israel; Italy; Latvia; Lithuania; Luxembourg; The Netherlands; Norway; Poland; Portugal; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; United Kingdom.

**Oceania:** Australia; New Zealand.

### 3. RESEARCH & DEVELOPMENT – Dairy

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 August 2017.

#### 3.1. InterGenomics-Holstein

Many of Interbull's current customers from Holstein populations involved in MACE asked for an investigation on how the InterGenomics model could be used by Interbull Centre to provide services required for genomic evaluation to these countries. Following the considerable interest expressed for such service during a workshop in Ljubljana in February 2017, the Steering Committee approved an InterGenomics-Holstein Research Run to be conducted in order to investigate the practical implementation of such service. Croatia, Ireland, Portugal, Slovenia, South Africa and Uruguay participated in this Research Run, which was conducted during the period May - August 2017. Results from the research run were discussed in Tallinn on 29 August 2017 in a follow up workshop to the Interbull Annual Meeting, which resulted in further commitments from Israel and South Korea. As a result, we continue developing the InterGenomics-Holstein service. The next pilot run will be held in May 2018, with the intention to perform test and routine runs in September and December 2018, respectively. Organisations interested in joining this new service are encouraged to contact the Interbull Centre for further details.



#### 3.2. Mendelian sampling trend validation

During the meeting on 13 December 2017, the Interbull Steering Committee decided that:

- Those countries validating their evaluations in 2018 because of the 2-year rule, or because of testing due to significant changes, will also need to provide Mendelian Sampling (MS) test results.
- Deadline for sending MS test results to Interbull Centre has been extended to end of March 2018.

We aim to review/discuss MS test results in the Interbull Workshop in August 2018. Any countries interested in testing their evaluations with the Mendelian Sampling Test are therefore encouraged to do so by the end of March 2018.

### **3.3. MACE robust to bias in trends; 'Robust MACE'**

During 2017, the Robust-MACE working group conducted a validation study in order to assess which model - MACE or RMACE- offers a better predictability. Although RMACE showed a slight advantage in some specific situations, results showed that no model offers a better predictability on all scales.

The effect of including a country\*year effect in the MACE model on correlations between countries was also tested by the working group. Overall results indicated that in the majority of cases the change in the estimated genetic correlation was very close to zero. For the very few cases that the change was observed, the change was negligible in comparison with the effect of post-processing.

### **3.4. International SNP Evaluations; 'SNPMace'**

The Interbull Steering Committee and Technical Committee, the Interbull Centre and InterGenomics Management Committee are working on the implementation of a feasibility study on the 'SNPMace' model, as proposed by SAC member Michael Goddard. SNPMace potentially provides a good way to integrate foreign information into national genomic models. As such SNPMace could in the long term become part of the Interbull Centre's service portfolio. Further preparations to implement this feasibility study with the use of Brown Swiss data are taking place. On 13 and 14 November 2017 Mike Goddard attended the SNPMace Project "Kick-off Meeting" at the Interbull Centre. During the meeting both technical issues (Interbull Centre's SNPMace activities, Project Plan) and organisational/legal issues were discussed (Agreements, Terms of Reference). The 'main' project, funded by Interbull, and making use of Brown Swiss data (as a case study) is expected to start early 2018. In order to coordinate different SNPMace projects initiated by different groups, the Interbull Steering committee has decided to form a working group. Current members of this SNPMace Working Group are: Enrico Santus (chair), Toine Roozen (secretary), Mike Goddard, Vincent Ducrocq, Esa Mäntysaari, Zengting Liu and Hossein Jorjani.



## 4. RESEARCH & DEVELOPMENT – Beef

### 4.1. Pilot run crossbred animals

A new pilot run for inclusion of crossbred animals was performed during January 2018. The results will be presented and discussed during the Interbeef Technical meeting in Auckland 2018. In the pilot run, new data with pure and crossbred animals from IRL was used in combinations with data from the January 2017 routine run (1701r) for the other countries. If the Interbeef Technical Committee approves the pilot run results, a test run with crossbred data from other countries will be performed during the March 2018 test run.

### 4.2. Calving traits – calving ease (cae) and birth weight (bwt)

To have a smooth transfer of the calving research project to routine evaluation, there was a decision in the 2017 Interbeef Technical meeting to perform a parallel test run at CMBC, CZE, and ITBC, SWE, for CHA and LIM calving traits (calving ease and birth weight) during fall 2017. It was also decided to test the same publication rules for calving traits as for animal weaning weight (aww). The original file format for calving traits was adjusted to harmonize with the file format for aww. With the changes in the file format, the workflow for estimation of breeding values for aww could be used also for calving traits with small changes in the workflow. A data call for the parallel test run was sent on 10 August 2017 to organisations participating in the research project. The result from CMBC and ITBC was compared and analysed and showed high correlations. The result from the ITBC run was distributed to the participating countries. As there were no negative feedback on the result, the decision to add calving traits to the Interbeef portfolio and to introduce the direct and maternal publication rules was taken by the chairmen of the Beef Technical Committee and Beef Working Group. The first routine run for calving traits (calving ease and birth weight) applying the same publication rules as for animal weaning weight is implemented in January 2018. A test run is planned for Beef Simmental in the March 2018 test run.

**Table 4.1: Breeds and populations participating in the research project for the calving traits ‘birth weight’ (bwt), and ‘calving ease’ (cae).**

Breed	Trait	Populations
CHA	bwt	4 (CZE, DFS, FRA, IRL)
	cae	4 (CZE, DFS, FRA, IRL)
LIM	bwt	5 (CZE, DFS, FRA, GBR, IRL)
	cae	5 (CZE, DFS, FRA, GBR, IRL)

### 4.3. Maternal publication rules

After the Interbeef test run in November 2017, it was decided to introduce the maternal publication rules for animal weaning weight. The maternal publication rules were also applied in the test run for calving traits. As there was no negative feedback on the result for calving traits, the chairmen of the Beef Technical Committee and Working group took the final decision to introduce the publication rules for animal weaning weight also on calving traits.

The maternal and direct publishable animals will be included in one file per trait (aww, cae and bwt).

#### 4.4. Female fertility

During fall 2017, VIT was given access to Interbull Centre's computing infrastructure to run Mix99, for estimation of breeding values, and MTEDC5, for estimation of reliabilities, in the female fertility project. A new data call, with minor changes in the file format was sent to participating countries on 27 November 2017, with a deadline for sending performance data of 20 December 2017. Renumbered data files from the new data call were sent to VIT on 21 December 2017. Estimated breeding values and reliabilities will be presented in the Interbeef technical meeting in Auckland 2018.

**Table 4.2: Breeds and populations participating in the research project for the female fertility traits 'age at first calving' (afc), 'calving interval' (cai) and 'number of calvings' (nca).**

Breed	Trait	Populations
CHA	afc	4 (DFS, IRL, DEU, CHE)
	cai	4 (DFS, IRL, DEU, CHE)
	nca	3 (FRA, DEU, CHE)
LIM	afc	5 (DFS, GBR, IRL, DEU, CHE)
	cai	5 (DFS, GBR, IRL, DEU, CHE)
	nca	4 (GBR, FRA, DEU, CHE)

#### 4.5. Carcass traits

The next Interbeef research project is related to carcass traits. A proposal on traits and file format will be presented in the Interbeef Technical meeting in Auckland 2018, with the intention for a data call during spring/summer 2018.

#### 4.6. Expansion of beef services

At the Interbeef Working Group meeting in Edinburgh 2017, it was discussed how IDEA's AnimInfo could be use for exchanging additional information with Interbeef. In preparation for the meeting in Auckland, a questionnaire was sent to Interbeef member countries, which addresses questions related to:

1. The number of genotypes, how and if they are willing to share the information with other beef member organizations etc.
2. Systems for collecting genetic defects, interest and willingness to share the information etc.
3. Interests and priorities in expansion of Interbeef traits and breeds.



## 5. RESEARCH & DEVELOPMENT – Infrastructure & Data Exchange

Most of Interbull internal program repositories (including version control) have been converted from “mercurial” to “git”. At the same time a self-hosted version of GitLab has been taken into production, that hosts all the git repositories. This gives an enhanced way to handle issues and documentation related, mainly, to repositories.

Plans and tests have been made for systems that will more easily expand and scale in case of growth and increased load.

### 5.1. IDEA Duplicates

Following the request from the latest survey on Costumers’ satisfaction, Interbull Centre has worked on facilitating Service Users’ handling of potential duplicates in IDEA. Until now, handling of such cases was only possible in an interactive way through the IDEA interface: Each potential duplicate had to be addressed on an individual basis. This was not a very efficient way for Service Users that had to deal with many cases which, as a result caused a large backlog, through delays in the way cross-reference were created and frustration among the Service Users that routinely processed such cases.

Since the new development has been put in place, users are able to download potential duplicates and process all of them at once by uploading the regular cross-reference file (file202). We hope that this will encourage all Service Users to process the potential duplicates faster, thus removing the backlog, and improving the quality of data stored in IDEA.

### 5.2. GenoEx

In recent years, the International Genotype Exchange Platform “GenoEx” has been developed at the Interbull Centre. The services to be provided through this platform are differentiated into three categories: Parentage SNP Exchange (GenoEx-PSE), Genotype Data Exchange (GenoEx-GDE) and Customised Genotype Repository (GenoEx-CGR).

In the current reporting period, intensive development, testing and error correcting activities, on both infrastructure and source code, have been carried out for GenoEx. Much effort has gone into creating flexibility and scalability for the platform, allowing for:

- Custom user interface;
- Faster/cheaper changes;
- Full control of integrations with other data at the Interbull Centre.

Sandbox environments have been setup for external testing of GenoEx-PSE, and production environment has been configured to handle future production.

The Platform’s website ([www.genoex.org](http://www.genoex.org)) is now live, and provides details on the first available service: GenoEx-PSE.



### 5.3. GenoEx-PSE

The main purpose of the GenoEx-PSE database is to provide a service for exchanging standardised sets of SNP for genotyped animals to facilitate and streamline parentage analysis activities carried out by organisations that are responsible and/or active in parentage integrity.



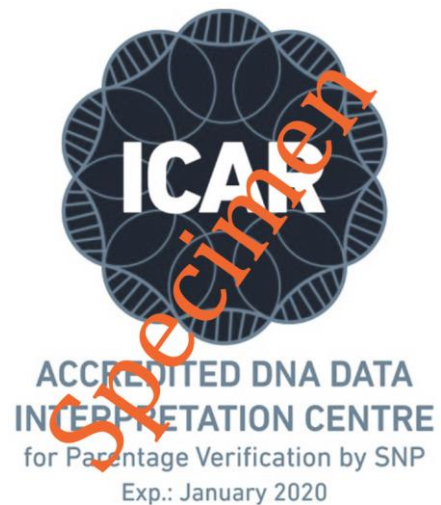
The “GenoEx-PSE User Manual”, and “GenoEx-PSE Code of Practice” have been created, and are, together with the Service User Agreement, available on the Platform’s website ([www.genoex.org](http://www.genoex.org)).

GenoEx-PSE service users are required to be in possession of a valid ICAR certificate for Parentage Analysis Accreditation for DNA Data Interpretation Centres.

### 5.4. ICAR Accreditation of DNA Data Interpretation Centres

ICAR introduced this accreditation service to its members in December 2017. The accreditation is currently restricted to **Parentage Verification by SNP**. Expansion to include **Parentage Discovery by SNP** is expected in 2018.

The Interbull Centre handles the technical component of this accreditation process. In this technical component the applicant receives a “DNA Data Handling and Interpretation Test file”. Once the applicant has processed this file and returned the results (which is due within 90 days), the Interbull Centre reviews and assesses the results, and determines the applicant’s status of "pass" or "fail" for the specific accreditation level. '**Accredited DNA Data Interpretation Centres**' will be listed on the ICAR website. The first of several applicants have now been processed, and accredited. Further information is available on the ICAR website: <http://www.icar.org/index.php/certifications/certification-and-accreditation-of-dna-genetic-laboratories/two-new-dna-based-services/dna-data-interpretation-centres/>.



## 6. RESEARCH & DEVELOPMENT – External 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) and the European Union, Co-funding for the development of GenoEx-PSE services has also been granted by ICAR. Contributions of the above organisations to the development of Interbull Centre services are gratefully acknowledged. Contributions made to R&D activities from participating organisations leading to improved or expanded Interbull Centre services are also much acknowledged.

Interbull Centre’s involvement in the following international consortia is focused on providing services to the project (enabling international exchange of data; quality control), and on developing services to the Interbull Community (several of whom are involved in the projects), in line with Interbull’s Strategic plans:

### “GenTore”

Project title: *Genomic management tools to optimise resilience and efficiency*

Project Period: 1 June 2017 – 31 May 2022 (60 months);

Funding source: European Commission; Horizon2020, Research and Innovation action;

Website: [www.GenTORE.eu](http://www.GenTORE.eu) (or [www.interbull.org/ib/gentore](http://www.interbull.org/ib/gentore))

Twitter: [@GenTORE\\_2020](https://twitter.com/GenTORE_2020)



### “ReDiverse”

Project title: Biodiversity Within and Between European Red Dairy Breeds - Conservation through Utilization

Project Period: 1 September 2017 – 31 August 2020 (36 months);

Funding source: European Commission; Era-Net SUSAN (ID 29)

Website: [www.interbull.org/ib/rediverse](http://www.interbull.org/ib/rediverse)

### “MethaBreed”

The Interbull Centre and several Interbull Service Users were involved in the MethaBreed Consortium. In September 2017, the Consortium was informed that the MethaBreed Project proposal (addressing *“Implementation of comprehensive phenotyping and breeding strategies across North-West Europe for the reduction of enteric methane emissions from dairy cattle”*) would unfortunately not be funded. We like to thank all Consortium members and especially its coordinator, Nicolas Gengler, for the hard work and leadership during the application process.

## 7. SERVICE CALENDARS

Schedules for International dairy and beef evaluations at the Interbull Centre are released upon approval by the Interbull Steering Committee and the Interbeef Working Group respectively. The latest service calendars are available online:

Interbull (Dairy): [www.interbull.org/ib/servicecalendar](http://www.interbull.org/ib/servicecalendar)

Interbeef (Beef): [www.icar.org/index.php/technical-bodies/working-groups/interbeef-working-group](http://www.icar.org/index.php/technical-bodies/working-groups/interbeef-working-group)

## 8. MEETINGS

### 8.1. 2017 Interbull Annual Meeting

The 2017 Interbull Annual Meeting was held in conjunction with the 68<sup>th</sup> annual meeting of the European Federation of Animal Production (EAAP) in Tallinn, Estonia.

During the Interbull Open Meetings the following topics were discussed:

- Methods and practical experiences for parentage analysis
- New developments in genomic methodologies and evaluations
- Genetic evaluation of new phenotypes

PowerPoint presentations of the open meetings are available through the Interbull Centre website: [http://www.interbull.org/ib/presentation\\_tallinn\\_2017](http://www.interbull.org/ib/presentation_tallinn_2017).

The Interbull Centre Activity Report (2016-2017) was presented to the approximately 150 attendees of the business meetings, and can be downloaded for details on personnel, finances, budgets, activities and plans from [www.interbull.org/ib/itbcreports](http://www.interbull.org/ib/itbcreports).



During the Business Meeting, the following **Interbull Steering Committee members** have been proposed (and subsequently approved by the ICAR Board meeting on 29 August 2017):

- New terms of four years for **Matthew Shaffer**, **Marija Klopčič** and **Brian Van Doormaal** as representatives of respectively Oceania, Central and Eastern Europe and North America;
- **Gordon Doak** to replace Marjorie Faust as the 2<sup>nd</sup> representative of North America.

**Marjorie Faust** has been a valued Steering Committee member since 2009, and has been instrumental in establishing the Interbull Annual meetings in conjunction with the American Dairy Science Association (ADSA). We like to thank Marjorie for her contributions to the Steering Committee, and the continued commitments that she offered to maintain the link between Interbull and ADSA, especially for the organisation of joint Interbull-ADSA Meetings and Symposia.

In addition to the Interbull Open Meeting and Business Meetings on Saturday and Sunday 26 and 27 August 2017, the Interbull Technical Committee, Steering Committee and Scientific Advisory Committee held meetings.

## 8.2. Future Meetings

### Interbull Annual Meetings

The SC agreed to organise the Interbull Annual Meetings jointly with ICAR in even years (2018, 2020, etc.), while alternating the odd years between EAAP (2017, 2021, etc.) and ADSA (2019, 2023, etc.). The Interbull Annual Meetings are scheduled to take place as follows:

- 2019 (June):** The 2019 Interbull Annual Meeting will be organised in collaboration with ADSA in Cincinnati, Ohio;
- 2020 (June):** The Joint ICAR-Interbull Meeting will be held in Leeuwarden, The Netherlands;
- 2021 (August):** The 2021 Interbull Annual Meeting will precede the EAAP meeting in Davos, Switzerland.

### Other Interbull Meetings

In 2018, the following additional meetings are scheduled:

**27 June 2018: Joint Interbull-ADSA Symposium** during the 2018 ADSA meeting in Knoxville, Tennessee, USA:

- ADSA and Interbull are jointly organising a Symposium on “**Phenotyping and genetics in the New Era of sensor data from automation**”. The Symposium on 27 June 2018 is designed for scientists and students with an interest in genetic/genomic evaluations and breeding programs, and making use of new data collected automatically on individual animals and their environment.

**25-26 August 2018: Interbull Workshop**, ahead of the 69<sup>th</sup> Annual Meeting of EAAP in Dubrovnik, Croatia:

- During the Interbull Technical Workshop in Dubrovnik we will focus on the development of Interbull Services such as SNP-Mace, Mendelian Sampling Test and InterGenomics-Holstein.

**27 August 2018: Joint Interbull-EAAP sessions** during the 69<sup>th</sup> Annual Meeting of EAAP in Dubrovnik, Croatia, addressing the following topics:

- Cow genotyping for genomic selection, management and marketing in cattle
- Optimization of a genomic breeding program for small-sized cattle populations

Updated information on future Annual Meetings and other meetings that may be of interest to the Interbull Community can be found on: [http://www.interbull.org/ib/ibc\\_future\\_events](http://www.interbull.org/ib/ibc_future_events).

## 9. COMMUNICATIONS and PUBLICATIONS

### 9.1. Interbull Bulletin

The Interbull Bulletin contains the state-of-the-art in genetic evaluation methods, as well as the most recent information on national and international implementations. During the period comprehended by this report the 51<sup>st</sup> and 52<sup>nd</sup> issue of the Interbull Bulletin were published:

No 51 (2017): Proceedings of the 2017 Interbull Meeting (Tallinn, Estonia, August 25 - 28 2017)

No 52 (2018): Special issue about the Interbull Centre

<https://journal.interbull.org/index.php/ib/issue/archive>

### 9.2. Web Site



The Interbull website ([www.interbull.org](http://www.interbull.org)) has been updated with the latest information.

The GenoEx website ([www.genoex.org](http://www.genoex.org)) has been created.

### 9.3. LinkedIn

The Interbull Centre company page is available on LinkedIn: Interbull Centre staff members have linked their individual profiles to the company profile.

### 9.4. Publications of Interbull Centre staff as authors or co-authors

Friggens, N., Kaya, C. & **Rozen, A.W.M.** 2017. GenTORE: Genomic Management Tools to Optimise Resilience and Efficiency. *Interbull Bulletin* 51, p. 91. Proceedings of the 2017 Interbull Meeting, Tallinn, Estonia, August 25 - 28 2017.

<https://journal.interbull.org/index.php/ib/article/view/1436/1500>

**Palucci, V., Jorjani, H., Benhajali, H., Hjerpe, E., Sendeck, J., Pedersén, M., Wasserman, C. & Rozen, T.** 2018. Interbull Centre – Special Issue. *Interbull Bulletin* 52, 45 pp.

<https://journal.interbull.org/index.php/ib/article/view/1438>

#### Publication of additional information:

- Interbull Centre Activity Report and Finance Report (as well as Business Meeting Minutes): [http://www.interbull.org/ib/bm\\_tallinn\\_2017](http://www.interbull.org/ib/bm_tallinn_2017)
- Pictures of the Tallinn Meeting in the 'Hall of Fame': <http://interbull30years.blogspot.se>
- Interbull articles and photos included in the ICAR September 2017 Newsletter: <http://www.icar.org/wp-content/uploads/2017/09/ICAR-Newsletter-September-2017.pdf>
- Video on Interbull Centre and its involvement in GenTORE (posted on 2 October 2017): <https://www.youtube.com/watch?v=-NhJmQKpSOA>