

# INTERBULL Centre

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INTERBULL is a sub-committee of the  
International Committee for Animal Recording  
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## Interbull Centre Activity Report 2000/2001<sup>1</sup>

### INTRODUCTION

Since the last annual meeting in Bled, Slovenia, May 2000, Interbull activities have increased considerably as per decisions taken at that meeting and at the workshop in Verden, Germany, October 2000. This document describes the activities at the Interbull Centre since the last annual meeting of Interbull. Workplans and future activities are also presented.

### BUDGETS AND FINANCES

Financial statements are in APPENDIX I. Budgets will be official pending approval by the Interbull Steering Committee on August 29, 2001. A proposal for a revised fee structure to be applied for expanded services has been developed and will be discussed at the Business Meeting in Budapest.

Budgets for 2001 and 2002 follow previous plans and assume that possible changes in the fee structure do not affect the total income. Full service fees for the udder health and Jersey conformation evaluations will apply as of 2002. The EU commission has continued to increase their support of the Interbull Centre. For 2000 a contribution of EUR 50,000 was received and EUR 60,000 has been decided for 2001. The accumulated balance is reserved for the delayed audit project and other R&D activities needed for development of expanded services.

Interbull membership fees are handled directly by the ICAR office, Rome, Italy, and reported at the official meetings of ICAR. For 2000 the membership income of Interbull amounted to EUR 37,656. A similar amount is anticipated for 2001 and 2002. Membership income is used to cover overhead costs for ICAR/Interbull, some travel expenses, publications and development work. The Interbull Centre also contributes about EUR 6,500 from service fees to cover these costs. Future membership income may change depending on the change in ICAR statues allowing for more members per country.

### PERSONNEL

**Georgios Banos** left his position at the Interbull Centre in December 2000 to take a position as associate professor at the Aristotle University of Thessaloniki, Greece. Georgios spent 9 years of dedicated work at the Centre and was instrumental for the development of international genetic evaluations of dairy cattle. **Ulf Emanuelson** has now been appointed the Interbull Centre Director.

**Thomas Mark** started in January 2001 to work as project manager at the Interbull Centre. Thomas has a Master's degree from Denmark and participates in the design and delivery of Interbull services, customer communication, and co-ordination of research. Interbull service fees finance Thomas' position.

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<sup>1</sup> Presented at the 2001 Interbull Meeting, Budapest, Hungary, August 29-31, 2001

## SERVICE AND OPERATIONAL ISSUES

International genetic evaluations for production traits were computed as scheduled in August and November 2000, and in February, May and August 2001, and test-runs were performed in September 2000 and March 2001. No new countries entered production evaluations, but several new country-breed combinations were added: Danish Red & White in the Holstein evaluation; South Africa in the Guernsey evaluation; Red Dane left the Brown Swiss evaluation to participate in the Ayrshire evaluation, that also had Germany added with the Angler breed; Germany and Italy participated in the Jersey evaluation. There were thus 27 populations in total included in the Holstein evaluation, and corresponding numbers for the Ayrshire, Brown Swiss, Guernsey, Jersey and Simmental evaluations were 10, 9, 5, 10, and 8, respectively, as of August 2001.

International genetic evaluations for (Holstein) conformation traits were computed according to the same schedule. First time participants in Holstein conformation evaluations were Hungary and Poland, and a new trait (rear leg rear view) was added at the test-run in September 2000, making the total number of traits evaluated 18.

### *Review of the Holstein conformation evaluation*

The genetic evaluation for Holstein conformation has been run under a sub-contract with a North-American consortium. A review of the contract was scheduled for the spring of 2001, and a group was assigned in February after the terms of reference for the review was adopted by the Steering Committee of Interbull. The group consisted of Enrico Santus (convenor), Egbert Feddersen, Filippo Miglior, and Hans Wilmink. The group delivered its final report to the Steering Committee in June 2001, and the report will be discussed during the Steering Committee meeting in Budapest, Hungary.

### *Udder health and Jersey conformation*

International genetic evaluations for udder health (milk somatic cells and clinical mastitis) and Jersey conformation have been the subject for thorough research and pilot studies. Results were presented and discussed at the most recent Interbull technical workshop in Verden, Germany, October 22-23, 2000. The conclusion from the workshop was that research had progressed to a level where introduction of routine international genetic evaluations could be recommended, and on December 18, 2000, the Interbull Centre announced to all members the launch of these new international genetic evaluation services.

A test-run including udder health data from 12 countries (Canada, Denmark, Estonia, Finland, France, Germany, The Netherlands, Norway, Sweden, Switzerland, United Kingdom, and USA) was conducted in March 2001. Results were distributed for review to participating countries on April 5, 2001, and the first routine evaluation for milk somatic cells and clinical mastitis was computed based on the same countries in May 2001.

The test-run of March 2001 also introduced conformation trait evaluation for the Jersey breed. The test-run included data from 7 countries (Australia, Canada, Denmark, New Zealand, Rep. of South Africa, United Kingdom, and USA), and the evaluation considered the same 18 traits as for the Holstein breed. Test-run results were distributed on April 3, and the first routine evaluation took place in May 2001. The Jersey conformation trait evaluation is performed by the same subcontractor, as is the Holstein conformation evaluation.

### *New weighting factors*

A modified procedure to derive weighting factors (Effective Daughter Contribution, EDC) for the international genetic evaluation of Interbull was developed based on research conducted mainly by Freddy Fikse at the Interbull Centre. A pilot study was first conducted and results presented at the 2000 Interbull meeting, and the weights were applied in a full-scale test-run for production traits in September 2000. Results of the test-run were reviewed by all participating countries, and discussed at

the workshop in Verden, Germany. It was concluded that differences in estimates of sire variances were small and differences in ranking of top bulls almost negligible, although EDC could be substantially different compared to the previously used weight (number of daughters). The new weights made, however, international reliabilities more aligned with national reliabilities.

The EDC's were used as weights in the subsequent routine evaluation for production traits (November 2000) and introduced as weights in the Holstein conformation evaluation at the test-run of March 2001. EDC's were used as weights already from start in the udder health and Jersey conformation evaluations.

#### *Parameter estimation procedures*

Research presented at the 2000 Interbull meeting showed possibilities of improving the genetic (sire) variance estimation procedure by changing the way genetic groups were treated in international genetic evaluations. The method used by Interbull was compared with a new method from Canada (University of Guelph), based on simulated data analyses where true parameters were known. In general, the two procedures yielded similar results with the relatively well-balanced and homogeneous simulated data, but the University of Guelph method has better theoretical foundation than the method that was used by Interbull. An added value of the new method was that it also enables monitoring Mendelian sampling variance over time, which could be useful in the context of data quality control.

The new sire variance estimation procedure was introduced for both production and (Holstein) conformation evaluation at the test-run of September 2000, and results were reviewed by all participating countries. The new procedure was subsequently used in the routine evaluation of November 2000.

The software to test effects of national modifications on genetic variance estimates, made available by Interbull Centre, was updated accordingly, thus also providing the possibility to monitor Mendelian sampling variance over time.

#### *Simultaneously tested bulls*

National genetic evaluations of all bulls passing standard edits are included in the international genetic evaluations at the Interbull Centre. However, international genetic evaluation results are released to participating countries only for bulls that are identified as officially publishable in at least one country. The decision to identify the genetic evaluation of a bull as officially publishable is made within each country based on local information. Bulls simultaneously progeny tested in more than one country may never, or very late, reach the level of reliability needed to get an official proof in any single country, and thus be included in the distribution file from Interbull.

If a bull is part of a simultaneous progeny-testing programme, but the genetic evaluation does not yet meet national standards for official publication, the record may now be assigned the new code "P", in the official publication field in the proof file sent by each country to the Interbull Centre. It is important to recognise that such bulls must be simultaneously progeny tested, as part of a planned breeding programme, and the correct assignment of the code is the responsibility of each national genetic evaluation unit.

Bulls with the code "P" in at least 2 countries, and having first crop sampling daughters in at least 10 herds in each country, will be included in the distribution of international genetic evaluation results. The opportunity to use the new code was implemented in the production trait test-run in March 2001 and will be implemented for other traits in the test-run in September 2001.

### *National data issues*

The quality of input data to the international genetic evaluations continues to be an issue. Introducing new traits made it possible for the Centre to compare data files within country and inconsistent coding of bulls is one aspect that was then revealed as a possible problem. It is important that countries correctly describe different sire categories, that is to distinguish between domestically proven bulls vs. imported bulls, young bulls with first batch of daughters vs. proven bulls with second batch of daughters, and most important of all between natural service bulls vs. AI bulls. The Centre has identified many cases where the coding of bulls varies between traits, or where coding changes from evaluation to evaluation, and this is not satisfactory. All members participating in the international genetic evaluation are therefore urged to verify their procedures for assigning the codes.

It is worth to re-emphasise the code of practice (7.1.5) that "Data on all bulls (domestic and imported) evaluated in the participating country with daughters in at least 10 herds should be sent to the Interbull Centre. ... Individual countries are responsible for identifying these records properly...". Data edits described in the service document (with amendments) are applied at the Interbull Centre only and individual countries must not implement any data edits. It is also important to realise that the pedigree information in the national dairy-production proof file (record type 010) forms the basis for the evaluation of all traits and that only bulls present in this file can get genetic evaluations.

Genetic evaluations have an absolute dependence on undisputed identification of animals. With no identification or wrong identification, the estimated components of variance as well as EBV's will be doubtful. Recent research has also shown that wrong or missing pedigree may underestimate the correlations between countries. The Interbull Centre can only work in collaboration with member countries in improving the identification of bulls, and members are kindly asked to help by carefully scrutinise the pedigree and cross reference files that are made available at the ftp-server of Interbull and to communicate anomalies to the Centre.

### *Documentation on genetic trend validation procedure*

The Interbull Steering Committee has decided that a full description of the trend validation procedure should be made available and it is now posted on the web site of Interbull (<http://www.interbull.org>) under "Publications and Documentation/Service Documentation/General".

### *Breed code list*

The ICAR working group on artificial insemination and related technologies has developed a list of breed codes to be used in international trade of bull semen. The list was presented to and approved by the ICAR board at the 32<sup>nd</sup> ICAR Session in Bled, 2000, and the Interbull Centre was asked to maintain the list and introduce necessary changes. Co-ordination with other relevant ICAR working groups and development of a procedure for assigning codes to new breeds entering the international trade of bull semen is ongoing.

## **RESEARCH AND DEVELOPMENT ISSUES**

The following considers both projects conducted at the Interbull Centre and projects conducted elsewhere in co-operation with Interbull. It is explained which institutes are mainly involved in each project.

### *Data connectedness and genetic correlation estimation*

Estimation of genetic correlation depends on adequate connections and links between data from different countries. There are currently problems in obtaining some genetic correlation estimates involving mostly small populations with very few links with the rest of the world. The objective of this project is to improve the genetic correlation estimation process in international genetic

evaluations, paying particular attention to the issue of data connectedness. Dr Hossein Jorjani of the Interbull Centre is the principal investigator in this project.

Work has thus far focused on the development of a method to select sub-sets of data with the desired properties of providing a good measure of connectedness in international genetic evaluations and at the same time avoiding bias in the data selection process. For this purpose, instead of examining populations as whole, contribution of single bulls to the connectedness among populations, through distribution of their number of daughters in the various countries, are considered. Consequently, for each bull an effective number of proofs (ENP) is estimated, which allows for selection of a smaller sub-set of bulls with the desired properties.

Full-scale test runs for estimation of genetic correlations among all participating populations (among others 27 populations of Holstein) have been performed. Different strategies for determination of appropriate levels of ENP, and hence different levels of connectedness, have been tested. Stability of results ((co-) variance structure) and rate of convergence have been used to assess different strategies. In addition to this, effect of time edit has been investigated. Results indicate that estimation of genetic correlation among 27 Holstein populations is quite feasible.

At this time, a simulation study is under way to explicitly assess the impact of data structure on genetic correlation estimation. The simulation is for six (6) countries with cow population size 2,000-64,000 animals/generation, 20-640 bulls tested/country/generation, progeny group size 10-100 daughters/young bull and semen exchange among countries. Future work regarding estimation procedures involves utilisation of parsimonious models.

#### *International genetic evaluation animal model*

International genetic evaluations are currently based on national evaluation results; hence, they depend on national genetic evaluation procedures. Despite standardisation efforts, the latter still vary from country to country thereby introducing sources of inconsistency in international evaluations. In addition, only bulls can be included in the current analysis and receive international breeding values. Demands for international evaluation and selection of cows, mostly to be used as bull dams, increase. International genetic evaluation based on individual performance records could alleviate these problems. The objectives of this project are to assess the feasibility and merit of an international genetic evaluation based on cow performance records, develop methods for genetic parameter estimation and conduct a pilot study analysing field data of Guernsey cows from several countries. Freddy Fikse is the principal investigator in this project and has spent eight months at the University of Wisconsin-Madison, USA, in co-operation with Drs Kent Weigel, Romdhane Rekaya and Dan Gianola.

Access to individual performance-records opens up new possibilities for statistical treatment of genotype by environment interaction. Geographical location is no longer the single criterion used for separating production environments, but other indicator variables can be employed. Fifteen data derived variables were evaluated for their ability to classify environments within and across countries. The various indicator variables could be categorised into descriptors of herd management, genetic constitution and climatic conditions. Guernsey lactation and pedigree records have been received from four countries for this field data analyses. We found that peak yield, days to peak yield, persistency, within-herd standard deviation, herd size, age at calving, calving pattern, rainfall, and maturity were significant environmental descriptors. In a parallel study at the University of Wisconsin, using Holstein data, the variables temperature, sire PTA milk, percent North American Holstein genes, herd size and peak milk yield were found to be applicable to divide production environments. This study will be reported upon during the 2001 EAAP meeting in Budapest.

Once suitable environmental descriptors have been identified, these can be used to study mode of operation of genotype by environment interaction. Five statistical models were considered, differing

in the structure of genetic and phenotypic parameters, as well as the way production environments were defined. It was concluded that there was little evidence for re-ranking of animals due to genotype by environment interaction, but that phenotypic differences between genotypes was more pronounced in favourable environments. A progress report is scheduled for the 2001 Interbull meeting by Freddy Fikse.

The project is expected to continue over the next 2 years. A simulation study is currently being designed to assess the relative merit of an international genetic evaluation based on cow performance records, compared to the method currently used. Several factors will be examined including, but not being limited to, genetic trend in cattle populations, genetic variance, genetic evaluation models (nationally and internationally), and population structure.

In a parallel project at the University of Wisconsin-Madison, applications of international animal models to Holstein production data from several countries are being investigated. Seventeen countries are participating in this project. A progress report is scheduled for the 2001 Interbull meeting by Kent Weigel and Nate Zwald of the University of Wisconsin-Madison.

#### *Multiple-trait MACE and investigation of procedures to estimate genetic correlations*

The aim of this project is to compare current procedures to estimate (co-)variance components for international genetic evaluations based on national genetic evaluation results with varying connectedness and heritabilities. The procedures investigated are the methods described by Sigurdsson et al. (Acta Agric. Scand. Sect. A 46, 1996), by Klei & Weigel (Interbull Bulletin 17, 1998) and by Madsen et al. (Interbull Bulletin 25, 2000). The research is mainly carried out by Per Madsen and Morten Kargo Sørensen at the Danish Institute of Agricultural Sciences in collaboration with Thomas Mark from the Interbull Centre. A project report will be presented at the Interbull meeting in Budapest August 2001.

The method of Madsen et al. (Interbull Bulletin 25, 2000), as applied in the DMU package, does not assume residual correlations to be zero and can therefore be used to estimate genetic correlation both within and across countries. The DMU package can also be used to compute multiple-trait-multiple-country sire evaluations. The method assumes deregressed national genetic evaluation results, and Schaeffer (Livest. Prod. Sci. 69, 2001) has already described a multiple trait deregression procedure that may be applied.

#### *Monitoring inbreeding and changes in the structure of global dairy cattle populations*

Globalisation of dairy cattle breeding has improved selection efficiency, but has also lead to increased relationships between animals, and thus higher risk for inbreeding and exhaustion of genetic resources. To enable controlling future problems, continuous monitoring of population structure and genetic relationships on a global level is required. Interbull routinely receives pedigree data on active sire populations for six dairy breeds and is in an excellent position to carry out such a duty. The Interbull Centre has initiated research and a report is planned for the WCGALP in Montpellier, August 2002. Thomas Mark is the principal investigator in this project.

#### *International evaluation of beef breeds*

Interbull Centre has participated as the ICAR representative in the discussion and development of a project on international evaluation for beef breeds. A 3-year contract between the partners in the project (Meat & Livestock Commission, Irish Cattle Breeding Federation Society Ltd, Institut de l'Elevage and ICAR) and two research institutions is expected to be signed shortly, but the project is actually already underway. The project initially involves data from only a few breeds (Charolais, Limousin), countries (France, Ireland, United Kingdom), and traits (calving ease, weaning weight, slaughter weight, weaning muscularity, weaning skeletal).

### *Survey of national genetic evaluation procedures*

At present, international genetic evaluations are based on results of national genetic evaluations from individual countries. Quality of the latter is crucial to ensure appropriate and useful international evaluations. National genetic evaluation procedures practised in various countries for dairy production traits were examined in a survey (1999-2000). The objective of this project is to use the survey results to produce widely acceptable recommendations for genetic evaluations and develop new data quality measures. Dr Hossein Jorjani of the Interbull Centre is responsible for this project and works closely with a group appointed by the Interbull Steering Committee for this matter (Drs Gottfried Averdunk, Rex Powell and Hans Wilmink).

Results from the survey and earlier Interbull guidelines were used to develop recommendations for genetic evaluations and address data quality issues. Draft recommendations and a discussion paper were distributed to Interbull members prior to the Interbull workshop in Verden, Germany, October 21-23, 2000, where data quality was a key theme. During the workshop there was extensive discussion on issues related to genetic evaluation recommendations. It was decided that such recommendations should be regarded as a description of the best industry practice. A revised version of the document (Interbull Guidelines) is presented to the Interbull Meeting in Budapest and to the Interbull's Steering Committee for final approval.

### *National data quality*

A joint project between the Interbull Centre and the University of Göttingen (Dr. Hermann Swalve), Germany, has been initiated. The objective is to develop a flexible software to provide a simulation environment for testing and comparing breeding value estimation programmes, as follow-up on the work of the Interbull Audit Group. A research grant donated by the German government has been obtained and Dr. Helge Täubert (Stuttgart, Germany) has been contracted, starting March 1st, 2001, for an initial period of 12 months to develop this software.

A survey on evaluation procedures and data structures in a sample of countries is ongoing. The results will be used in developing algorithms to generate observations according to country specific data structures. The structure of the simulation environment is currently being designed.

### *Interbull research portfolio and priorities*

The Interbull Centre, with the assistance of the Steering Committee and their resource persons, has prepared a document listing research topics in the field of international genetic evaluation. The purpose of the document is fourfold:

- List ongoing research projects;
- Identify which aspects of the international genetic evaluation process require more study;
- Prioritise these items from an Interbull perspective;
- Communicate those to potential research partners.

The document will be available on the web site of Interbull (<http://www.interbull.org>) under "Publications and Documentation/General information" as soon as it is finalised.

### *R&D funding*

In addition to funds raised from service fees, research and development at the Interbull Centre is financed by grants from the Swedish University of Agricultural Sciences, National Association of Animal Breeders (NAAB) and the United States Department of Agriculture (USDA), the European Union, and the World Guernsey Federation.

Contributions of the above organisations to the future development of Interbull services are gratefully acknowledged.

## **INTERBULL PUBLICATIONS/PRESENTATIONS**

The following Interbull-related publications/presentations were produced since the 2001 Interbull meeting:

**Interbull Bulletin No. 25.** Proceedings of the 2000 Interbull meeting, Bled, Slovenia, May 14-15, 2000.

**Interbull Bulletin No. 26.** Proceedings of the Interbull Technical Workshop, Verden, Germany, October 22-23, 2000.

**Interbulletin July 2000.** The Official Newsletter of the International Bull Evaluation Service (Interbull).

**Interbulletin June 2001.** The Official Newsletter of the International Bull Evaluation Service (Interbull).

Emanuelson, U. 2000. INTERBULL Annual meeting held in Bled, Slovenia, May 14-15, 2000. EAAP-News, Livest. Prod. Sci. 65, 283-285.

Emanuelson, U. 2001. Genetic evaluation in cattle: an international approach. Proc. VI Holstein de Las Americas Congress, São Paulo, Brazil, April 24-27, 2001, 133-144.

Emanuelson, U. 2001. International genetic evaluations for health traits. General assembly, Svensk Avel, May 16, 2001 (in Swedish).

Fikse, W.F. & Banos, G. 2001. Weighting factors of sire daughter information in international genetic evaluation. J. Dairy Sci. 84, 1759-1767.

Fikse, W.F. & Philipsson, J. 2001. International genetic evaluations using performance records. 10th World Guernsey Conference, Drakensburg, South Africa, March 22-24, 2001.

Fikse, W.F. & Sullivan, P.G. 2000. Estimation of sire variances in international genetic evaluations models with genetic groups. J. Dairy Sci. 83 (suppl. 1), 60 (Abstr.).

Fikse, W.F., Rekaya, R. & Weigel, K. 2000. Guernsey international genetic evaluation using performance records: preliminary report. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. Interbull Bulletin no. 25, 8-12.

Fikse, W.F., Rekaya, R. & Weigel, K. 2001. Genotype by environment interaction for milk production traits in Guernsey cattle. J. Dairy Sci. 84 (suppl. 1), 214 (Abstr.).

Jorjani, H. 2000. Impact of input data quality on national genetic evaluations. J. Dairy Sci. 83 (suppl. 1), 53 (Abstr.).

Jorjani, H. 2000. Well-connected, informative sub-sets of data. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. Interbull Bulletin 25, 22-25.

Jorjani, H. 2000. Data Quality and Interbull Guidelines for National Genetic Evaluation Procedures. Presented to Interbull Meeting, May 14-15, 2000, Bled, Slovenia.

Jorjani, H. 2000. Input / output data quality: Interbull Recommendations for National & International Genetic Evaluation Systems of Dairy Cattle. Presented to Interbull Technical Workshop, Verden, Germany, October 22-23, 2000.



Jorjani, H. 2001. Simultaneous estimation of genetic correlations for milk yield among a large number of Holstein populations. *J. Dairy Sci.* 84 (suppl. 1), 215-216 (Abstr.).

Mark, T. 2001. Increased focus on functional traits in international cattle breeding. Paper at the Annual Farmers Meeting, Herning, Denmark, February 26-27, 2001 (in Danish).

Mark, T., Fikse, W.F., Sigurdsson, A. & Philipsson, J. 2000. Feasibility of international genetic evaluations of dairy sires for somatic cell count and clinical mastitis. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. *Interbull Bulletin* 25, 154-162.

Mark, T., Fikse, F., Banos, G., Emanuelson, U. & Philipsson, J. 2001. Summary of MACE pilot-runs for somatic cell count and clinical mastitis. Proc. of the Interbull Technical Workshop, Verden, Germany, October 22-23, 2000. *Interbull Bulletin* 26, 43-52.

VanRaden, P.M., Powell, R.L. & Emanuelson, U. 2000. Investigation of an alternative approach to international evaluations. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. *Interbull Bulletin* 25, 18-21.

Weigel, K.A., Rekaya, R., Zwald, N.R. & Fikse, W.F. 2001. Estimation of genetic correlations between countries and prediction of sire breeding values using individual animal performance records. *J. Dairy Sci.* 84 (suppl. 1), 215 (Abstr.).

Weigel, K., Rekaya, R., Fikse, F., Zwald, N. & Gianola, D. 2000. Preliminary report on international dairy sire evaluation using individual performance records. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. *Interbull Bulletin* 25, 3-7.

Weigel, K., Rekaya, R., Fikse, F., Zwald, N. & Gianola, D. 2000. Data structure and connectedness issues in international dairy sire evaluations. Proc. of the 2000 Interbull Meeting. Bled, Slovenia, May 14-15, 2000. *Interbull Bulletin* 25, 26-30.

Wickham, B.W., Banos, G., Emanuelson, U. & Philipsson, J. 2000. INTERBULL Report for 1998 and 1999. 32nd ICAR Session and INTERBULL Meeting. Bled, Slovenia, May 14-19, 2000.

## **WORKPLANS**

### *Services*

Routine evaluations for production, conformation and udder health

Release dates (second Monday each of the following months):

2001 August 13  
November 12  
2002 February 11  
May 13  
August 12  
November 11

Test runs for production, conformation and udder health:

2001 September  
2002 March  
September

### *Research*

“Data connectedness and genetic correlation estimation” project: work in progress.

“International genetic evaluation based on individual performance records” project: work in progress.

“Software development for national evaluation auditing purposes” project: work in progress.

“Multiple-trait MACE and investigation of procedures to estimate genetic correlations” project: work in progress.

“Monitoring inbreeding and changes in the structure of global dairy cattle populations” project: work in progress.

#### *Meetings*

Annual Interbull meeting, 2002, in conjunction with the ICAR meeting in Switzerland, May 26-31, 2002.

Interbull sponsored session at 7th World Congress on Genetics Applied to Livestock Production (WCGALP) in France, August 19-23, 2002.

#### *Planned Publications*

**Interbull Bulletin:** Proceedings Interbull Open Meeting August 30-31, 2001, Hungary.

**Interbull Bulletin:** Interbull Guidelines for National & International Genetic Evaluation Systems of Production Traits in Dairy Cattle.

## Interbull Centre Finances and Budgets

CHF = Swiss Francs (years 1997, 1998, 1999)

EUR = Euro (years 2000, 2001, 2002)

1CHF = 0.66 EUR (July 4, 2001)

|   | 1997                      | 1998           | 1999           | 2000           |                           | 2001           | 2002           |
|---|---------------------------|----------------|----------------|----------------|---------------------------|----------------|----------------|
|   | Actual<br>CHF             | Actual<br>CHF  | Actual<br>CHF  | Budget<br>EUR  | Actual<br>EUR             | Budget<br>EUR  | Budget<br>EUR  |
| <b>Income</b>                           |                           |                |                |                |                           |                |                |
| Service fees <sup>1</sup>               | 303,902                   | 364,233        | 495,307        | 344,500        | 345,572                   | 387,462        | 422,000        |
| Research grants <sup>2</sup>            | -                         | 19,830         | 136,181        | 107,250        | 98,577                    | 100,000        | 120,000        |
| Other grants (EU)                       | -                         | 32,000         | 64,000         | 52,000         | 50,000                    | 60,000         | 60,000         |
| <b>Total</b>                            | <b>303,902</b>            | <b>416,063</b> | <b>695,488</b> | <b>503,750</b> | <b>494,149</b>            | <b>547,462</b> | <b>602,000</b> |
| <b>Expenses</b>                         |                           |                |                |                |                           |                |                |
| Salary costs <sup>3</sup>               | 159,239                   | 212,740        | 378,018        | 263,250        | 241,868                   | 260,000        | 290,000        |
| Computer costs                          | 21,657                    | 36,684         | 41,372         | 32,500         | 33,708                    | 35,000         | 40,000         |
| Travels,<br>conferences <sup>4</sup>    | 27,635                    | 34,630         | 46,208         | 29,250         | 32,191                    | 35,000         | 50,000         |
| Publications                            | 3,865                     | 12,542         | 19,021         | 13,000         | 11,773                    | 13,000         | 15,000         |
| Phone, fax, postage                     | 15,487                    | 21,499         | 25,494         | 16,250         | 12,024                    | 16,000         | 17,000         |
| Steering Comm.<br>and ICAR <sup>5</sup> | 10,000                    | 10,000         | 12,320         | 9,750          | 6,343                     | 25,000         | 15,000         |
| Miscellaneous                           | 1,381                     | 1,338          | 3,617          | 3,250          | 3,916                     | 4,000          | 5,000          |
| Outsourced<br>activities <sup>6</sup>   | -                         | -              | -              | 39,000         | 21,114                    | 70,000         | 85,000         |
| Office and univ.<br>adm. Costs          | 59,800                    | 82,300         | 131,500        | 97,500         | 90,810                    | 113,000        | 128,000        |
| <b>Total</b>                            | <b>299,064</b>            | <b>411,733</b> | <b>657,550</b> | <b>503,750</b> | <b>454,050</b>            | <b>571,000</b> | <b>645,000</b> |
| <b>Balance</b>                          | <b>4,838</b>              | <b>4,330</b>   | <b>37,938</b>  |                | <b>40,099</b>             | <b>-23,538</b> | <b>-43,000</b> |
| <b>Accum. balance</b>                   | <b>-3,642<sup>7</sup></b> | <b>688</b>     | <b>38,626</b>  |                | <b>78,725<sup>8</sup></b> | <b>55,187</b>  | <b>12,187</b>  |

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1 Service fees include for production 311,800 (311,800), conformation 75,662 (84,200) for 2001 (2002) and in 2002 also for udder health (26,000)

2 NAAB/USDA, World Guernsey Cattle Federation and SLU supported research

3 Salary costs including social benefits for on average 3.4 (4.1) scientists, 1.4 (0.6) programmers and 0.4 (0.4) secretary in 2000 (2001). 4.6 scientists are budgeted in 2002 for development of expanded services

4 In 2002 Interbull meetings with ICAR in Interlaken and at WCGALP in Montpellier

5 Costs for review of contracts and protection of Interbull and its logo are included for 2001 and for a Technical Advisory Committee in 2002

6 Includes 70% of conformation fees, i.e. 53,000 (59,000), and 17,000 (26,000) for the audit and other projects in 2001 (2002)

7 Includes an accumulated deficit in 1996 of 8,480

8 Accumulated balance resulting from delay in the start of the outsourced audit project (starting in 2001) and of employing scientist