



## Interbull Centre Activity Report 1998/99<sup>1</sup>

Since the last annual meeting in Rotorua, New Zealand, January 1998, Interbull activities have increased considerably as per decisions taken at that meeting and results presented at the workshop in Cremona, Italy, October 1998. Quarterly routine evaluations for production and conformation evaluations have been introduced. Research and development activities have expanded both in-house and in collaboration with different research groups worldwide. Further a strategic analysis of Interbull was conducted to provide the basis for the further development of the organisation within the framework of ICAR. Higher service fees decided upon in 1998, an EU contribution and greatly appreciated external research grants supported our increased activities. In the following more details are reported in the various areas of work.

### Finances and budgets

The expanded Interbull activities are reflected by its finances (APPENDIX I). Income from service fees has increased by about 50% since 1997 due to both increased number of participating countries and the new fee structure. The research grants for 1998 were considerably smaller than budgeted as the hired scientists were not available for the planned research projects until November 1998. The EU contribution was also delayed.

Budgets for 1999 (slightly revised according to the actual situation) and 2000 follow previous plans and assume no further changes in the fee structure. For the latter half of year 2000 service fees are also charged for the Holstein conformation evaluation based on 15 countries subscribing to this service.

Interbull membership fees are handled directly by the ICAR office, Rome, Italy, and reported at the biennial meetings of ICAR. For 1998 the membership income of Interbull amounted to CHF 44,547. A similar amount is anticipated for 1999. Membership income is used to cover overhead costs for ICAR/Interbull, some travels, publications and development work. The Interbull Centre also contributes CHF 10,000 from service fees to cover these costs. Future membership income will depend on the outcome of the ongoing strategic review of ICAR.

### Personnel

Two new persons were hired by the Department of Animal Breeding and Genetics, Uppsala, Sweden, for the Interbull Centre in 1998. **Dr. Ulf Emanuelson** started in September 1998 and will be providing support to all service related functions. Dr. Emanuelson's position is financed by Interbull service fees. **Dr. Hossein Jorjani** started in November 1998 to provide support to the Interbull research and development programme. Dr. Jorjani's position is financed by a 3-year fund from the USDA and NAAB.

**Dr. Eckart Gruenhagen** from Germany spent two months (July and September) in 1998 at the Interbull Centre developing the electronic home page (web site). He also conducted a member survey to develop links with their home pages and improve the communication content. His position was financed by German funds.

Starting in September 1999, **Dr. Georgios Banos** is taking a one-year academic sabbatical leave to the University of Thessaloniki, Greece. During this period Dr. Banos will maintain 30% of his involvement with Interbull matters.

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<sup>1</sup> *Interbull Business Meeting, August, 1999, Zurich, Switzerland*

The Interbull Centre is currently looking for a computer programmer to enhance its technical capacity. Operational needs instigated the need for such position. The position will be initially for one year, financed by funds made available by Dr. Banos' sabbatical leave. The incumbent will provide support to optimising the international genetic evaluation system throughput including programme streamlining, data quality checking and control, and process automation. Six applications were received by the deadline of August 2 and are currently under review.

## **Services - production traits**

As of November 1998, the frequency of Interbull genetic evaluations for production traits increased from two to four times per year. Such evaluations are now being computed each February, May, August and November. Currently 24 countries subscribe to the service, the last country to join being Hungary (February 1999). In 1998 a new improved method to estimate international evaluation reliability was introduced, based on scientific work of Livestock Improvement, New Zealand. Some major changes also took place in individual country national evaluations during the last year. These include the introduction of test-day model genetic evaluations in Germany and Canada and across-breed genetic evaluation in Australia. The impact of these changes on Interbull evaluations were examined in separate test-runs whose results were peer reviewed by representatives of all participating countries.

## **Services - conformation traits, Holstein breed**

### *Subcontract*

This issue was discussed in length during the Steering Committee meeting on October 12, 1998, in Cremona, Italy. Following the meeting a call for tenders was issued inviting external organisations to place forward proposals for subcontracting part of computations. A North American Consortium consisting of the US Holstein, National Association of Animal Breeders, Canadian Dairy Network and Holstein Canada asked to consider their proposal presented at the Cremona workshop as their official proposal. No other response to the call for tenders was received.

On March 4, 1999, a meeting of ICAR, Interbull and North American representatives took place in Paris, France to progress with the project. Final arrangements, following consultation with all Steering Committee members, led to the development of a contract. In the first instance, it will be a 3-year contract with review at the end of the second year. The new service was described in detail in a document distributed on to all Interbull members.

A technical committee was appointed to oversee the project, consisting of H. Wilmink (Chairman), G. Banos (Interbull), B. Klei and G. Kistemaker (North American Consortium) and R. Reents (independent at-large member).

### *Operations*

On March 22, 1999, the Interbull Centre announced to all members the launch of a new international genetic evaluation service for conformation traits. In the first instance, 15 countries subscribed by signing a letter of understanding: Australia, Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States of America. This number is expected to increase as per member survey in February 1999 indicating as many as 18 countries were ready to participate.

On April 15-17, 1999, Bert Klei from the US Holstein visited the Interbull Centre to discuss several operational aspects of the subcontract.

A test-run including 14 bull populations from 13 countries was conducted in May 1999. Results were distributed and reviewed by participating countries and the technical committee. Due to problems in

estimation of genetic correlations, four populations were finally excluded from the test-run. Efforts are in place to alleviate the problems and allow these populations to be included in the evaluation.

In August 1999 the first routine international genetic evaluation for conformation traits took place including data from 10 countries. Results were distributed to 15 countries subscribing to this service.

In the meantime requests for international conformation evaluations have been put forward also for other breeds (Ayrshire, Jersey, Brown Swiss). Status of harmonisation of traits and methods of evaluation need to be reviewed for these breeds.

## **Research and development at the Interbull Centre**

A major thrust to Interbull's research and development programme was given by a 3-year fund from the USDA/NAAB, USA. The agreement is for research to take place at the Interbull Centre aiming at improving international genetic evaluation methods. This project finances Hossein Jorjani's and 50% of Freddy Fikse's positions. At a video-conference in December 1998, the Interbull Centre presented to US representatives the research priorities of Interbull which were in good agreement with research suggested by the funding group. The research priorities were set and agreed upon.

Progress has been made in the following research areas:

### ***1. Optimal weighing of daughter information from different countries (Freddy Fikse)***

*The problem:* Weights on daughter information used in the current international genetic evaluation may influence estimation of genetic parameters and reliability of international breeding values. At present, actual number of daughters is used as approximate weighing factor.

*Work completed:* Totally 6 new weighing factors were developed and tested. Effects considered, in different proportions, were number of daughters and lactations, contemporary group structure, female relationships and the breeding value reliability of the bull's mate. Weighing factors were tested on simulated datasets where true parameters were known. Results were compared to true parameters. Genetic variance estimates were affected by the choice of weighing factors. Weighing factors considering the bull's mate effect appeared to perform best; however, the benefit was small. Genetic correlation estimates were not affected by the choice of weighing factors. Some results were presented at the last ADSA meeting in Memphis, TN, June 20-24, 1999 and more results will be presented at the Interbull Open meeting in Zurich, August 26-17, 1999.

In a related project investigating the use of national reliabilities to derive weighing factors, Mr. Fikse co-operated with Pete Sullivan of CGIL, Canada, and will be presenting their work at the Interbull Open meeting.

*Work planned:* Final recommendations and a scientific manuscript for the Journal of Dairy Science are being prepared.

Short-term improvement in the international genetic evaluation service is expected as result of this study.

### ***2. International genetic evaluations based on individual performance records (Freddy Fikse)***

*The problem:* International genetic evaluations are currently based on national evaluation results; hence, they depend on national evaluation procedures. Despite standardisation efforts, the latter still vary from country to country thereby introducing sources of inconsistency in the international

evaluation. 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.

*Work in progress:* A three-point work plan has been prepared:

- a) Design and development of simulation studies to investigate the relative merit of international genetic evaluations based on national evaluation results (current method) and individual performance records (new method) assuming known genetic parameters; various models for national and international evaluation will be tested; this step sets out to assess the superiority of the new method.
- b) Development of methodology to estimate data connectedness and genetic parameters for implementation of the new international genetic evaluation method; estimators will be tested with simulated data developed in (a).
- c) Application of the new method on suitable field data; the World Guernsey Federation has already shown interest and pledged support in gaining access to individual country data; starting with such small and manageable dataset is a sensible way of testing the new method under field conditions; additional field data analyses may be planned.

*Work planned:* These three topics will be addressed in the above order over the next two years. In the beginning of 2000 Mr. Fikse plans to spend six months at the University of Wisconsin-Madison, to work with the research group there primarily on topic (b). The Wisconsin group is currently involved in similar studies and the planned collaboration is expected to benefit the project.

Long-term improvement in the international genetic evaluation service is expected as result of this study.

### **3. Across country data connectedness and genetic correlation estimation (Hossein Jorjani)**

*The problem:* Estimates of genetic correlations between countries considerably influence international genetic evaluations. Estimation of genetic correlation presupposes presence of adequate connections among data.

*Work completed:* Assuming at first a fixed-effect model, Dr. Jorjani developed and applied an algorithm for the determination of geometric connectedness of bulls from various countries/populations currently included in the Interbull evaluation. Separate analyses were performed for Holstein, Ayrshire, Brown Swiss and Simmental. Results have so far indicated that, within each breed, all bull populations are statistically linked to each other. Hence, all bull differences in any country should be estimable without bias. This is a useful conclusion attesting to the statistical appropriateness of the current procedure. A progress report is prepared for the Interbull Open meeting in Zurich.

*Work planned:* Next steps will be to

- a) Develop more quantitative estimates of various levels of connectedness and associate with the accuracy of genetic correlation estimates;
- b) Develop software to optimise identification of informative data for genetic correlation estimation.
- c) Investigate the use of covariance structure in determining genetic correlations that are not estimable with the current method

Short to medium-term improvement in the international genetic evaluation service is expected as result of this study.

### **4. Input data quality (Hossein Jorjani)**

*The problem:* At present, international genetic evaluations are based on results of national genetic evaluation procedures practised in individual countries. Suitable national results should a) accurately reflect the genetic merit of animals based on local information in an individual country; b) be consistent across country. The need to closely examine the various procedures and methods was recognised.

*Work completed:* A questionnaire was designed and distributed to all Interbull members to collect and review detailed information on various national genetic evaluation systems. Information requested includes checks on data and process quality performed nationally.

*Work planned:* Responses to the questionnaire are currently being studied. A summary will be presented at the Interbull Open meeting in Zurich and results will be published in an Interbull Bulletin. Completion of this step is expected in September 1999, at which point further research will be planned. The objective will be to develop evaluation software and assess its suitability to different data structures and models, as follow-up to pertinent work of the Interbull Audit Group. The anticipated scale of the exercise will necessitate collaboration with other research institutes. Co-ordination of efforts with the University of Göttingen in Germany is investigated.

Results of the review of national evaluation systems may provide the basis for a workshop aiming at improving national and international models for genetic evaluation and a new set of Interbull guidelines in this area. The previous one was published in Interbull Bulletin No 4, 1990.

Medium-term improvement in international genetic evaluation is expected as result of this study.

The above 4 research projects are mainly financed by the USDA/NAAB fund. Some additional finances were made available by the European Union. Financial support will be also sought by the World Guernsey Federation for the international animal model pilot study (project 2c, above).

## **Other related research**

Since May 1999, Thomas Mark of the Royal Veterinary and Agricultural College, Denmark is visiting the Swedish University of Agricultural Sciences (host of the Interbull Centre). Mr. Mark is working on application of current Interbull methods to the analysis of somatic cell count and mastitis data from different countries. Agust Sigurdsson, previously of the Interbull Centre, and Freddy Fikse co-operate with Thomas Mark. Jan Philipsson and Lars Gjøl Christensen act as joint supervisors.

Results from this study are expected to increase the technical know-how regarding such traits and pave the way for expansion of the service to include somatic cell counts.

## **European Union financing**

In 1996 the Interbull Centre was recognised by the European Union (EU) as their official reference laboratory in the area of genetic evaluations and animal testing. At the end of October 1998 we were informed that the 1998 EU budget had allowed the payment of ECU 20,000 to the Interbull Centre for its activities. This money was used to cover part of our R&D costs. For 1999, EU will be making 40,000 ECU available to the Interbull Centre. This contribution is planned to support the development of software for auditing national genetic evaluation systems applied in member countries. Discussions with Herman Swalve at the University of Göttingen, Germany, are under-way. Possibilities to solicit matching funds from German sources for this project are investigated.

## **Strategic plan for ICAR/Interbull**

During 1998 a strategic analysis of Interbull based on interviews and surveys of members and other stakeholder groups was conducted by Georgios Banos. The outcome was discussed with the ICAR executive board during the EAAP meeting in Warsaw, August 1998, and in the Interbull Steering

Committee at the Cremona workshop, October 1998. The importance of a joint strategic ICAR/Interbull plan has been emphasised and such work will be reported separately.

## **Publications, presentations, meetings and workshops**

*The following Interbull-related publications were produced in 1998/1999:*

**Interbull Bulletin No. 17.** Proceedings of the 1998 Interbull Meeting, Rotorua, New Zealand

**Interbull Bulletin No. 18.** Proceedings of the International Workshop on GIFT; Fertility and Reproduction, Grub, Germany

**Interbull Bulletin No. 19.** Proceedings of the Intermediate Report Workshop EU Concerted Action GIFT, Warsaw, Poland

**Interbull Bulletin No. 20.** Proceedings of the Computational Cattle Breeding '99 Workshop Tuusula, Finland.

**Interbulletin,** The Newsletter of Interbull, June 1999

G. Banos. 1998. "Review of international genetic evaluation procedures in dairy cattle" Anim. Breed. Abstr. 66:585

J. Philipsson. 1998. "Global use of bulls and the INTERBULL system". Acta Agric. Scand., Sect. A, Animal Sci. Suppl.29, 98-107.

B.W. Wickham and G. Banos.1998. "Impact of international evaluations on dairy cattle breeding programmes" Proc. 6<sup>th</sup> World Congress on Genetics Applied to Livestock Production. 23:315

G.W. Rogers, G. Banos and U. Sander Nielsen. 1998. "Correlations among US traits and calving traits in Denmark and Sweden" J. Dairy Sci. 81 (Suppl. 1)

G.W. Rogers, G. Banos, U. Sander Nielsen and J. Philipsson.1998. "Genetic correlations among somatic cell score, productive life, and type traits from the United States and udder health measures from Denmark and Sweden" J. Dairy Sci.81:1445

W. F. Fikse and G. Banos. 1999. "Weighting factors of daughter information in international genetic evaluation for milk production traits: effect on (co) variance components". J. Dairy Sci. 82:72 (Suppl. 1).

G.W. Rogers, G. Banos and U. Sander Nielsen. 1999. "Genetic correlations among protein yield, productive life, and type traits from the United States and diseases other than mastitis from Denmark and Sweden" J. Dairy Sci. 82:1331:1338.

*The following presentations were made by Interbull staff in 1998/1999:*

J. Philipsson. "Guernsey Global Breeding Plan". 9<sup>th</sup> World Guernsey Conference, Louisville, Kentucky, USA, March 1998.

G. Banos "Can international genetic evaluations enhance genetic progress in an individual country" National Dairy Genetics Workshop. Orlando, Florida, USA, April 1998.

J.Philipsson. "Use of Interbull information in genetic evaluation of sires - global strategies and recommendations for Poland". Workshop Jastrzebiec, Poland, October 1998.

G. Banos "Importance of uniform international criteria in genetic evaluation" International Symposium on the Future of Dairy Cattle. Povoia de Varzim, Portugal, November 1998.

G. Banos "International genetic evaluations for production and type for the Red & White breed". European Congress Red & White Cattle. Agerskov, Denmark April 1999.

G. Banos "Recent developments in international genetic evaluations; emphasis on conformation traits". 24<sup>th</sup> European Holstein Conference. Charmey, Switzerland April 1999.

U. Emanuelson "Impact of national evaluation models on international comparisons" Computational Cattle Breeding '99 Workshop Tuusula, Finland, March 1999.

F. Fikse. "Weighting factors of daughter information in international genetic evaluation for milk production traits: effect on (co) variance components" ADSA annual meeting, Memphis, TN, USA, June 1999.

*The following meetings/workshops were (co)organised:*

Interbull Technical workshop. Cremona, Italy, October 11-12, 1998

GIFT intermediate workshop. Warsaw, Poland, August 23, 1998

International Workshop on High Performance Computing and New Statistical Methods in Dairy Cattle Breeding. Helsinki, Finland, March 18-20, 1999

GIFT workshop; Longevity. Jouy-en-Josas, France, May 9-11, 1999

## **Workplans**

### *Services*

Routine evaluations, production & conformation

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

1999	November 8
2000	February 14
	May 8
	August 7
	November 13

Test runs, production & conformation: September 1999, March and September 2000

### *Research*

"Weighing factors" project: expected completion September/October 1999-08-09

"Data connectedness and genetic correlation estimation" project: work in progress

"International genetic evaluation based on individual performance records" project: to be initiated October 1999

"International genetic evaluations for somatic cell count": work in progress at Swedish University of Agricultural Sciences

“Software development for national evaluation auditing purposes” project: to be initiated in 2000, pending on Steering Committee approval

### *Meetings*

GIFT Final Workshop, November 7-9, Ede, The Netherlands

Interbull Annual Meeting, May 14-15, 2000, Bled, Slovenia

### *Publications*

Interbull Bulletin: Proceedings GIFT workshop on longevity, May 9-11, 1999, France

Interbull Bulletin: Proceedings Interbull Open Meeting August 26-27, 1999, Switzerland

Interbull Bulletin: Survey of genetic evaluation methods and procedures in various countries

### **New Interbull Steering Committee members**

Service terms of Gottfried Averdunk (German speaking countries representative) and Lars Gjöl Christensen (Nordic countries representative) expire this year. Both indicated their intention to retire from the Steering Committee and be replaced by others to represent these regions. Their dedication and valuable contribution to Interbull are gratefully acknowledged.

Steering Committee members should have industry support in the regions they represent. Candidate names are put forward by the Steering Committee to the Business meeting for nomination and are then appointed by the ICAR Board.

On behalf of the Interbull Chairman, Klaus Meyn investigated for candidates from the German speaking countries and Jan Philipsson from the Nordic countries. There is support in the respective industries for Reinhard Reents (Germany) and Jarmo Juga (Finland). They would both make important contributions to Interbull.

### **Concluding remarks**

During 1998/99 Interbull has gone through a very active period of work with increased activities in all areas, partly with new staff, and in constructive collaboration with many organisations, research groups and individuals around the world. The collaborative spirit of our members, partners and associates is greatly appreciated.

Uppsala, Sweden

August 19, 1999

Georgios Banos

Jan Philipsson



## INTERBULL CENTRE FINANCES AND BUDGETS (Swiss Francs - CHF)

	<b>Actual 1997</b>	<b>Budget 1998</b>	<b>Actual 1998</b>	<b>Budget 1999</b>	<b>Budget 2000</b>
<b>Income</b>					
Service fees	303,902	384,000	364,233	472,000	530,000 <sup>6</sup>
Research grants	-	165,000	19,830 <sup>1</sup>	160,000	170,000
Other grants (EU)	-	-	32,000 <sup>2</sup>	64,000 <sup>3</sup>	80,000
<b>Total CHF</b>	<b>303,902</b>	<b>549,000</b>	<b>416,063</b>	<b>696,000</b>	<b>780,000</b>
<b>Expenses</b>					
Salary costs	159,239	310,000	212,740	385,000 <sup>4</sup>	405,000
Computer costs	21,657	40,000	36,684	50,000	50,000
Travels, conferences	27,635	34,000	34,630	40,000	40,000
Publications	3,865	15,000	12,542	20,000	20,000
Phone, fax, postage	15,487	20,000	21,499	30,000	30,000
Steering comm. and ICAR	10,000	15,000	10,000	10,000	15,000
Miscellaneous	1,381	5,000	1,338	5,000	5,000
Outsourced activities	-	-	-	20,000 <sup>5</sup>	73,000 <sup>7</sup>
Office and univ. adm. costs	59,800	110,000	82,300	136,000	142,000
<b>Total CHF</b>	<b>299,064</b>	<b>549,000</b>	<b>411,733</b>	<b>696,000</b>	<b>780,000</b>

**Note:** Interbull membership fees are handled directly by the ICAR office, Rome, Italy, and reported at the biennial meetings of ICAR. For 1998 the membership income of Interbull amounted to CHF 44,547. A similar amount is anticipated for 1999. Membership income is used to cover overhead costs for ICAR/Interbull, some travels, publications and development work. The Interbull Centre also contributes CHF 10,000 from service fees to cover these costs. Future membership income will depend on the outcome of the ongoing strategic review of ICAR.

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1 NAAB/USDA supported research started Nov -98

2 EU support for 1998 paid June -99

3 EU support for 1999 decided July -99

4 Salary costs incl. social benefits for on average 3.9 scientists, 0.7 programmer and 0.3 secretary

5 Planned for auditing program development

6 Includes 47,000 for conformation evaluations

7 Includes 33,000 for outsourced conformation evaluations