ICBF Annual Report - February 2001 to January 2002

Irish Cattle Breeding Federation Society Limited

24th May 2002

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1 SUMMARY

Following the establishment of the permanent structure in July 2000 ICBF's focus has moved on to the technical aspects of establishing efficient and effective cattle breeding practises in Ireland.

The highlight of the year was the implementation of the animal events system in conjunction with the commencement of database operations. While there have been teething problems and the implementation strategy had to be modified to ensure service disruptions were minimised the much-anticipated benefits of an integrated database are now being realised.

A number of enhancements to the EBI were implemented this year and as a consequence Holstein Friesian breeders now have information that can be used to address the serious fertility problems that resulted from previous breeding decisions. It is now clear that by making good use of existing milk recording calving dates and information from foreign populations it is possible to identify sires and families with the optimal combination of genetic merit for productive and reproductive traits required by Irish conditions. As the database becomes fully operational there will be opportunities to further enhance the EBI.

Beef cattle breeding continues to be a priority for ICBF. While the revamping of Tully and enhancements to genetic evaluations for beef traits are important contributions to more effective beef breeding the low level of performance recording remains as a major obstacle to substantial progress. A major effort is required to establish beef performance recording on a more widespread basis.

Improving the genetic quality of Irish cattle is the reason for ICBF's existence. The database will improve the accuracy and scope of the data that can be used in improved genetic evaluations. Only when breeding decisions are based on these improved evaluations will the quality of beef and dairy cattle improve. While progress with the database and genetic evaluation system is pleasing to report much still remains to be done towards greater use of the improved evaluations in breeding decisions.

2 INTRODUCTION

The Irish Cattle Breeding Federation Society Limited (ICBF) has been established with the objective of achieving the greatest possible genetic improvement in the national cattle herd for the benefit of Irish Farmers, the Dairy and Beef industries and Members. Genetic improvement comes about when the parents of the next generation are genetically superior to their contemporaries. Bringing improvement about requires not only a clear understanding of what constitutes superior but also access to quantitative information on those traits of importance for large numbers of animals. In pursuit of its mission ICBF is currently focused on establishing a database in which the data required for cattle breeding is stored and used for genetically evaluating potential breeding stock.

This report has been prepared for the purpose of providing ICBF's shareholders and other stakeholders with a summary of activities and achievements in relation to the objective of the Society between 1st February 2001 and 31st January 2002.

3 Operations

Staff

ICBF staff have been appointed in keeping with plans and budgets. Two new appointments were made to the staff of ICBF during the year bringing the total to ten. A Quality Manager commenced employment on 23rd April 2001 and a Database Analyst commenced employment on 20th August 2001. These two positions were established to support respectively ICBF's data quality responsibility and the need to extract information from the ICBF database. The full time staff of ten includes two people on secondment from the Department of Agriculture Food and Rural Development (DAFRD).

Contractors

Three contractors working on three-year contracts compliment ICBF's staff. Two of these are dedicated to the database development and one to developing and implementing animal evaluation systems for dairy cattle.

Development Projects

At its current stage of evolution ICBF is undertaking a number of development projects aimed at establishing the infrastructure, which includes databases and genetic evaluation systems, required to facilitate rapid rates of genetic gain in the Irish cattle population. As a consequence, a substantial proportion of staff time is devoted to this project work.

Animal Events Data Collection

During the year the animal events data collection system commenced operation. South Western Services (SWS) were awarded the contract for keying the extra data, over and above that required by DAFRD for calf registration from the animal events sheets. This operation also provides telephone support to farmers. That some 200,000 calvings were processed with minimal delay by this unit within SWS from the animal events system in the first five months of 2002 is testimony that this operation is now operating according to expectations.

Central Printing and Distribution

One of the benefits of a central database is that information distribution can be facilitated using automated systems. A first step in this direction has been taken by contracting SWS to use its extensive printing and distribution facilities for reports going to dairy farmers. During the year this facility was used for distributing EBI reports on two occasions, distributing the missing information report as part of the process for implementing the database and more recently for pedigree certificates for Holstein Friesians.

Genetic Evaluation Contracts

Three organisations are contracted by ICBF to compute genetic evaluations and provide technical support for dairy cattle. These are; CR Delta for dairy production traits, Edinburgh University for Holstein conformation traits and the Dutch research organisation ID-Lelystad for calving interval and survival.

4 Services

ICBF is establishing a range of services to the cattle breeding industry to facilitate genetic gain in the Irish cattle population. These services will be provided by ICBF on a fee paying basis to its members and other customers in the cattle breeding industry.

4.1 Genetic evaluations

Genetic evaluations are published on a number of media including ICBF's website for use by farmers and the breeding industry. Revenue from this information is generated through ICBF's AI approval and genetic evaluation service to licensed organisations.

Dairy cattle genetic evaluations for production and conformation traits were published on schedule in February, May, August and November of 2001. February 2001 evaluations were the first official run of the EBI (Economic Breeding Index) introduced as a replacement of the RBI (Relative Breeding Index). The EBI incorporates calving interval and survival traits for the first time and is based on a breeding objective of maximising farm profitability.

Beef AI bull progeny test results were published on an across breed basis. This development means that Irish cattle farmers are now able to compare AI bulls both within and between breeds for the traits included in the progeny test. This is an important step in the development of systems for ensuring cattle breeders produce the best possible cattle for meeting market requirements.

Results from the central performance test centre at Tully were published at the end of each test and were also made available to bulls owners for the purposes of marketing the tested bulls.

Genetic evaluations for beef traits were computed and provided to the breeders of Limousin, Charolais and for the first time Simmental cattle. These evaluations utilised weight and linear score data collected by the respective Herd Books and weight data as part of DAFRD's weight recording service.

4.2 AI approvals and genetic evaluations

ICBF's AI (Artificial Insemination) approval and genetic evaluation service continued to generate revenue in 2001. Under this service Licensed organisations are able to obtain genetic evaluations that they can use for commercial purposes – primarily the promotion of semen sales. The service also assists customers with obtaining AI approvals from DAFRD.

Since the introduction of this service in January 2000 346 bulls have been approved for use in AI. Table 1 provides a summary of the bulls approved under this service and the service income generated by ICBF.

Table 1. Volume and income associated with AI approval and animal evaluation services for period 1st February 2001 to 31st January 2002.

Service	Volume	Unit Price (€)	Total Charge (€ excl. VAT)
Animal Evaluation License	9	1651	14,859
AI Approval Service Charge	212	114	24,168
Special Breeding Purposes	135	57	7,695
Dairy Progeny Test	38	127	4,826
Beef Progeny Test	62	127	7,874
HF Animal Evaluation	49	343	16,807
Other Animal Evaluation	50	64	3,200
Total			**79,429**

4.3 Database & Software services

The ICBF database has been designed to enable ICBF members to provide a range of information services to cattle farmers. It will provide a single point of entry for data collected from farms and will link with DAFRD's calf registration and CMMS (cattle movement monitoring system) systems. The database will take data from AI, Milk Recording and Herd Book services provided by ICBF member organisations to Irish cattle farmers. It will store all of this data so that future access is facilitated and duplication is avoided. The data held in the database will be accessible through computer screens installed in the offices of member organisations as well as in printed reports, electronic files and web pages for access by cattle farmers.

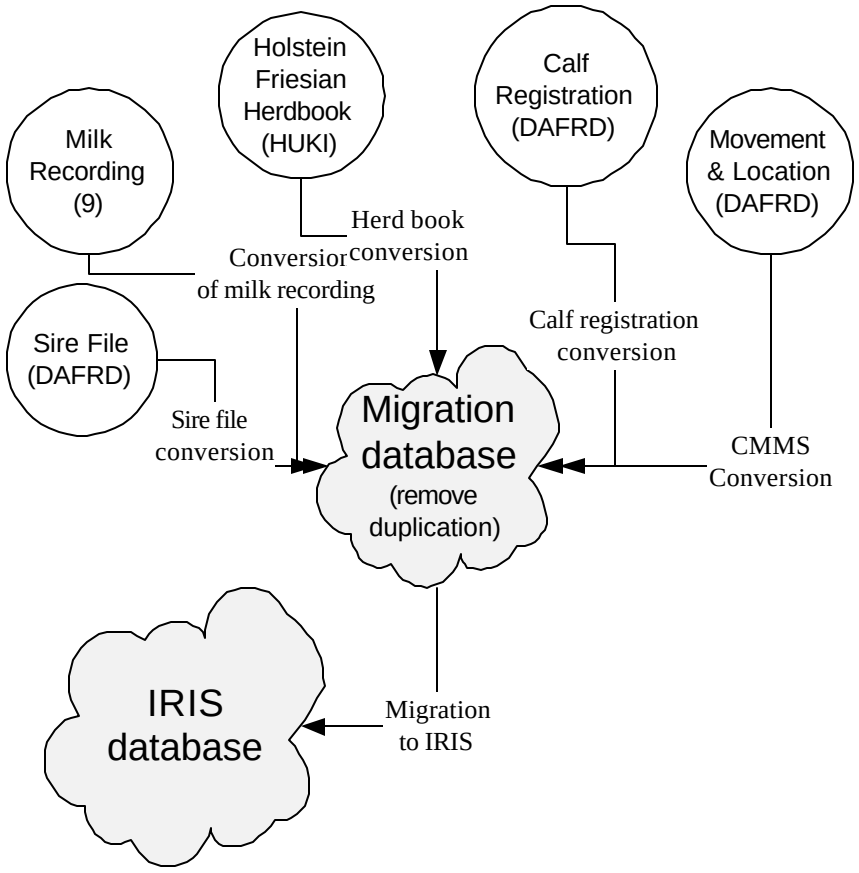


Figure 1. *Data migration process showing data sources and steps in migration.*

Data migration and Missing Information

Reports

During the year the database commenced operation. However, before operation could commence existing data held in the databases of DAFRD, milk recording organisations and Holstein UK & Ireland was migrated into the new database. This process turned out to be more complex than anticipated due to the many different systems of identification used for the same animal and the need to minimise disruption to the provision of services. Figure 1 illustrates the sources of data and the process followed in data migration.

It was decided that a special effort was required to reconcile animal records from milk recording, Holstein herd book and DAFRD calf registration and CMMS systems. This was needed as each of these three systems used a different method to identify an animal and cross references were missing for over 25% of cows currently in milk recording. The missing information report (MIR) specially developed for this purpose and was printed and distributed

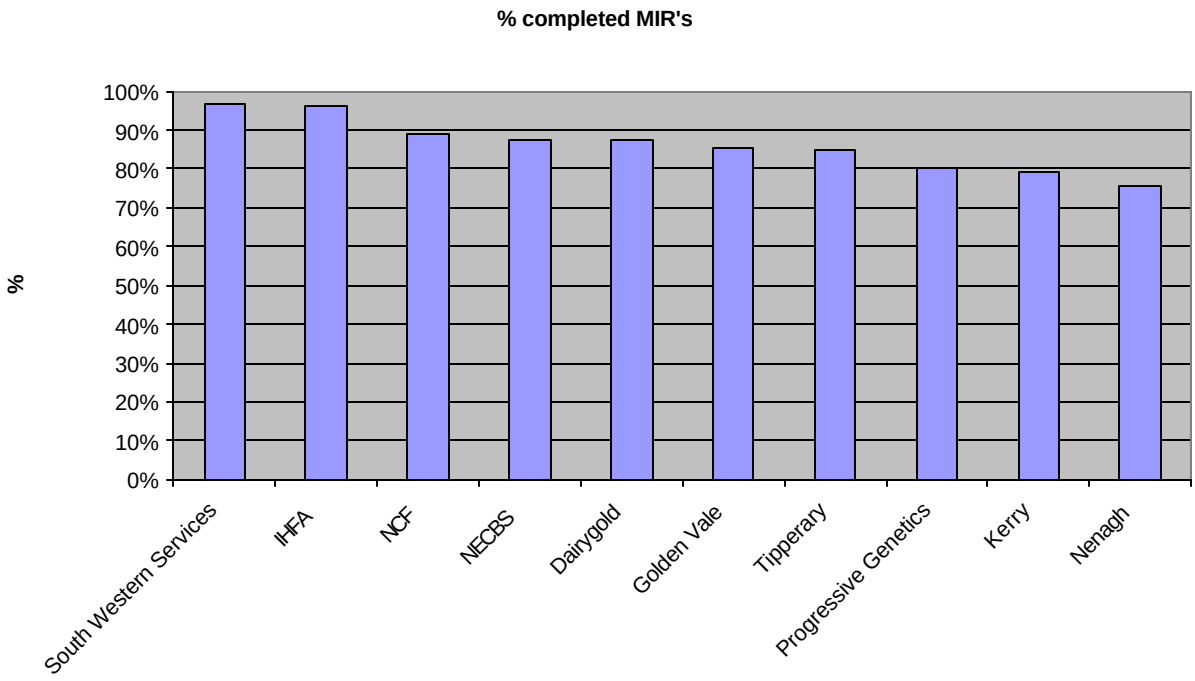


Figure 2. *Returns of missing information reports for each service provider.*

to those farmers who had given approval for ICBF to access their DAFRD data. As a consequence some 80,000 duplicate records were eliminated. The response of farmers to this request for information was very satisfactory as shown by figure 2.

Wide Area Network

A wide area network was established during the year to link service providers with the central database computer located at ICBF's office in Shinagh House, Bandon. This network comprises a combination of leased lines (to Dairygold and Kerry) and dial-up 64k ISDN (to IHFA and all other milk recording service providers) lines. Each organisation has been

Figure 3. *Work flow for animals event system showing relationship with DAFRD calf registration system.*

equipped with network connections, computers and printers as required by their volume of business.

Animal Events - System

After a series of discussions and meetings an agreement was reached with DAFRD for the animal events system to be recognised as a source of calf registrations upon which passports will be issued. Figure 3 shows work flow and the relationship between animal events and DAFRD's calf registration system.

Animal Events – Farmer Education

Farmer training in the use of the Animal Events recording system was provided by TEAGASC at a series of some 120 training sessions in December 2001. Farmers were invited to participate in these courses held in local TEAGASC offices. Overall attendance was some 60% of milk recording and IHFA member herds.

That the training achieved its objective is illustrated by figures 4 and 5 that show farmer responses to a questionnaire completed at the end of training. Figure 4 shows their understanding before training and figure 5 understanding after training.

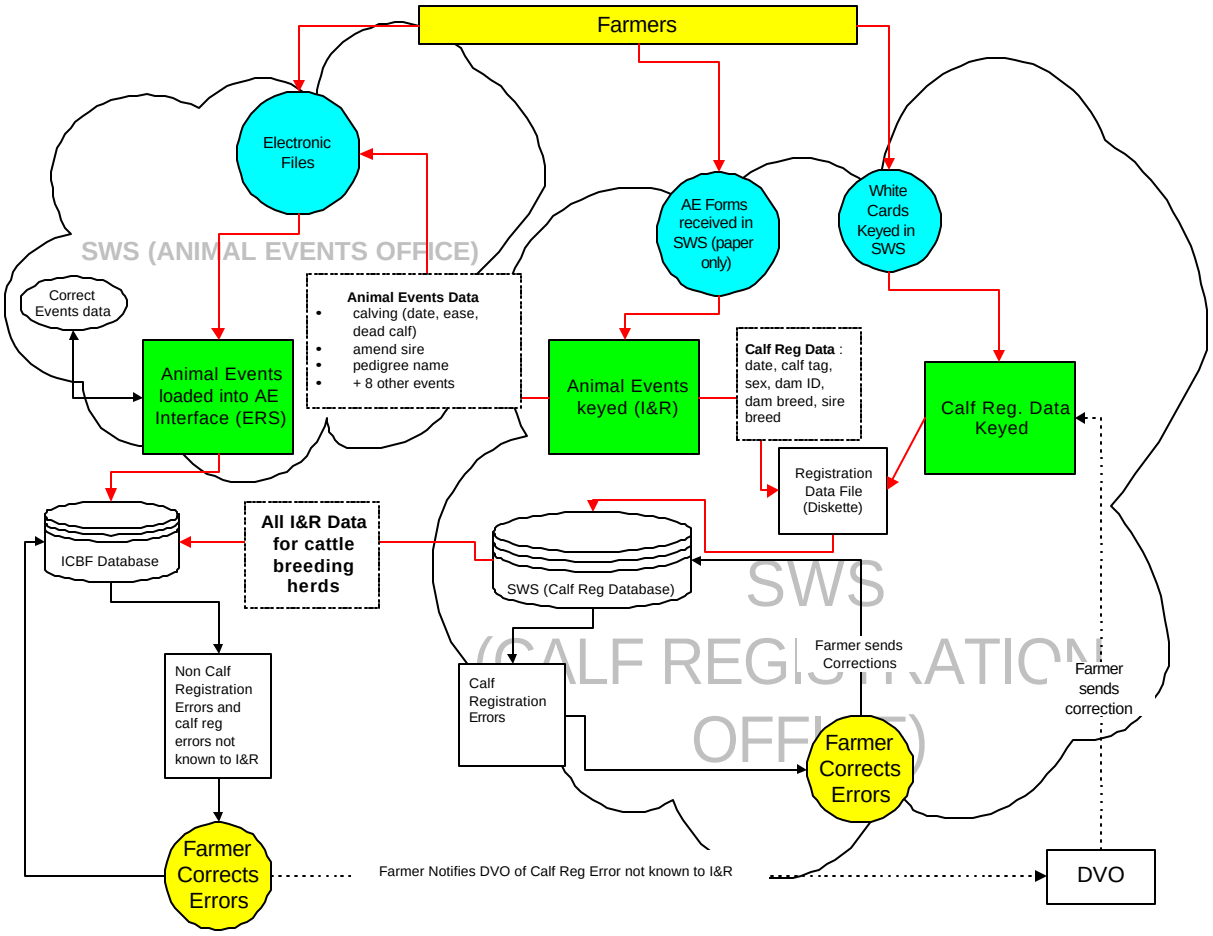
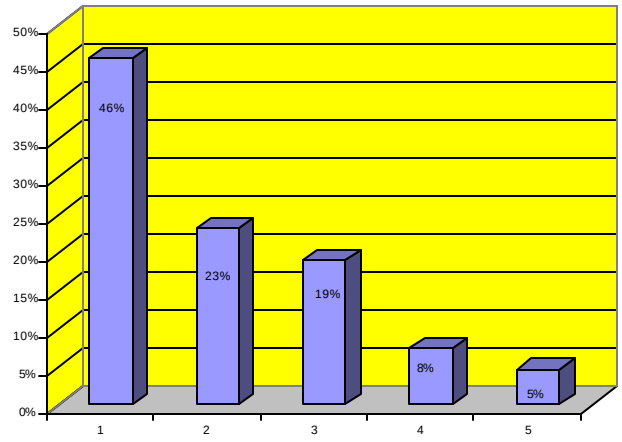
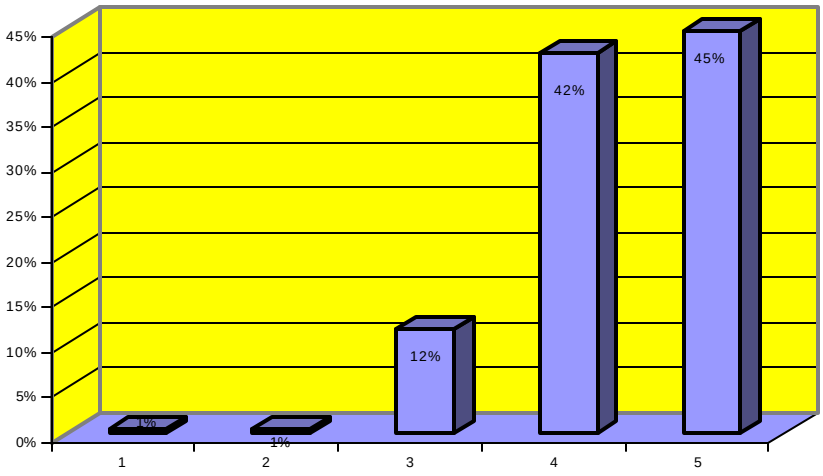

Farmers
Electronic Files
AE Forms received in SWS (paper only)
White Cards Keyed in SWS
SWS (ANIMAL EVENTS OFFICE)
Correct Events data
Animal Events Data
calving (date, ease, dead calf)
amend sire
pedigree name
+ 8 other events
Animal Events loaded into AE Interface (ERS)
Animal Events keyed (I&R)
Calf Reg Data : date, calf tag, sex, dam ID, dam breed, sire breed
Calf Reg. Data Keyed
Registration Data File (Diskette)
ICBF Database
All I&R Data for cattle breeding herds
SWS (Calf Reg Database)
SWS (CALF REGISTRATION OFFICE)
Farmer sends Corrections
Farmer sends correction
Non Calf Registration Errors and calf reg errors not known to I&R
Calf Registration Errors
Farmer Corrects Errors
Farmer Corrects Errors
Farmer Notifies DVO of Calf Reg Error not known to I&R
DVO

Figure 4. Understanding BEFORE Training



Farmers self ranking on his understanding level (1 = V Low, 5 = V High)

Figure 5. Understanding AFTER Training



Farmers self ranking on his understanding level (1 is V Low, 5 is V High)

Animal Events – Farmer Uptake

Animal events books were distributed to milk recording herd owners early in January 2002 for immediate use. Farmers known to be using approved software packages were not sent a copy of the book and encouraged to email event information to the Animal Events Unit.

Initial uptake of animal events has been very good as illustrated in figure 6, which shows the percentage of herds that have continued with the use of "white cards".

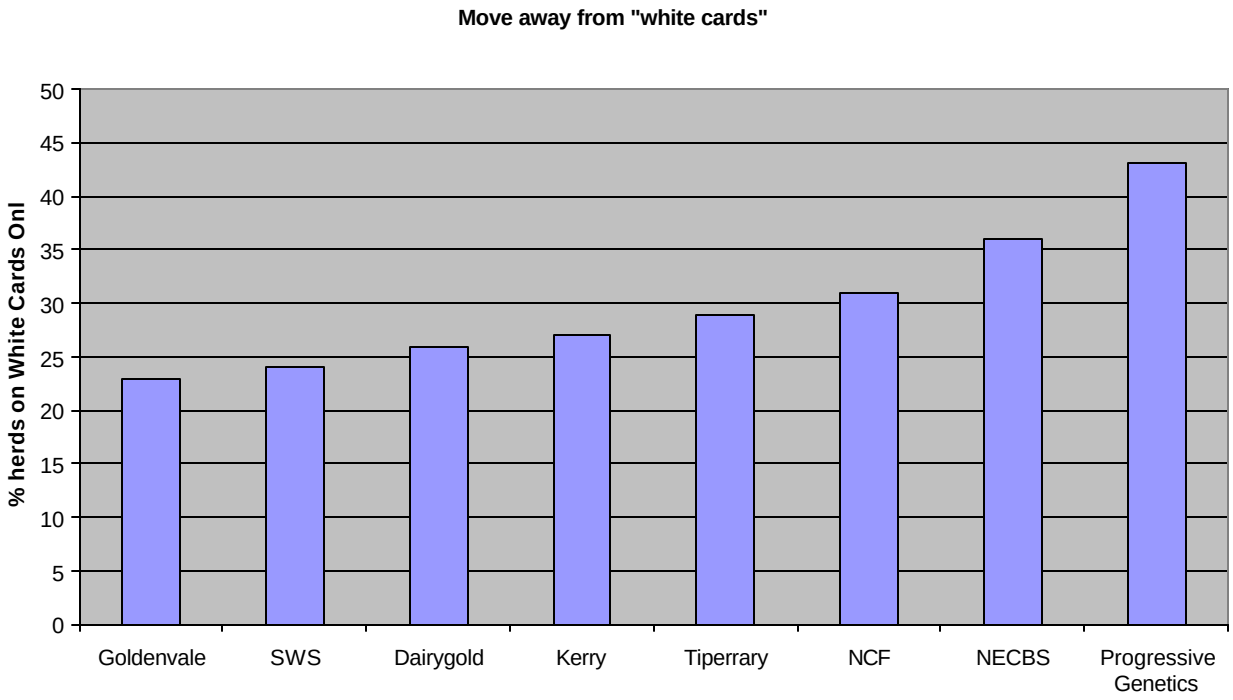


Figure 6. *% of herds continuing to use only white cards to record calvings and calf births.*

Data quality – consistency

One measure of the benefits of establishing a single shared database is the extent to which the data it contains is more consistent than it is in the systems being replaced. An analysis of the extent to which calving date of the dam, and birth date of the calf agree has been conducted for the historical data and for the data that has accumulated since the implementation of the database. The results as summarised in figure 7 show that the discrepancies have been dramatically reduced through the use of animal events to provide a single source of this information and the use of a single database to store it.

Database Implementation

The database implementation has taken longer to implement than originally expected. This has been due to three main factors:

a. The complexity of data migration being greater than expected. The main problem has been associated with the resolution of animal identifications while at the same time ensuring milk recording and other data is not lost.

b. Time required for the delivery of functional specifications to CR Delta and consequential delays in the delivery of completed software from CR Delta.

c. Agreeing and finalising the details of the animal event system in association with DAFRD.

The winter period is the ideal time for implementing the database because there are relatively small volumes of milk recording and registration data. However, the milk recording organisations expressed serious reservations about proceeding with implementation on the basis of the state of development of the database in mid January 2002. On the other hand a

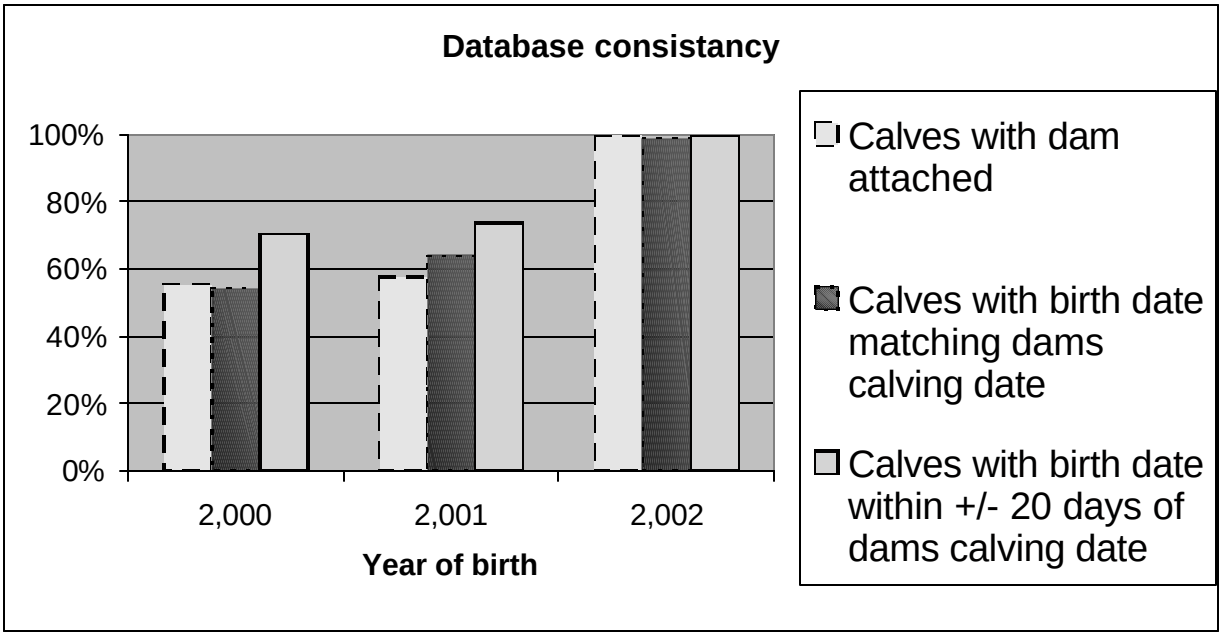


Figure 7. *Analysis of database information showing % of calves by year of birth with known dam, % of calves with known dam with same date of birth as dams calving date, and % of calves with known dam whose date of birth is within + or – 20 days of dams calving date.*

commitment had been made to IHFA to have the pedigree functions available not later than 31st December 2001. Following consultation with milk recording organisations and with IHFA it was been decided that implementation should proceed on the following basis:

a. Priority would be given to ensuring the functions required by IHFA would be established and supported a quickly as possible. The four main functions required being pedigree certificates, grading up, linear inspections and invoicing.

b. An interim system would be put in place to provide animal details and animal event data from the database to the IDRC milk recording software. The IDRC software would

continue to be used by the Milk Recording service providers until such time as the database is ready to support their needs.

4.4 Conservation of Genetic Diversity

During the year the software developed by Trinity College for computing inbreeding amongst potential sires and dams has been rewritten in the Fortran language and used to provide the Kerry Cattle Society with a list of the five least related sires with semen available for each live cow. Semen from a further two bulls has been processed into conservation stocks.

4.5 Foot & Mouth Disease Emergency

The outbreak of Foot & Mouth disease early in 2001 had a major impact on the business of ICBF's shareholders. ICBF undertook a number of initiatives in association with its service providing members to minimise the impact of the emergency on milk recording and artificial insemination services.

5 Projects

ICBF's projects are focused on establishing the infrastructure required for an efficient and effective cattle breeding programme for Ireland. Each project has specified objectives that are pursued using a range of resources including those of ICBF, its member organisations and contractors from within Ireland and other countries. Most of ICBF's projects are supported to varying extents by NDP (National Development Plan) funds. This support is gratefully acknowledged.

5.1 Implementation of Cattle Breeding Database

The database project has reached the stage where the first components are now operational as outlined above.

5.2 Implementation of Beef Breeding Review Recommendations

Beef cattle breeding is a priority for ICBF. The recommendations of the Simm & Amer report are being implemented through a series of beef breeding initiatives. To achieve the overall objective of increasing the rate of genetic gain in the national beef population it will be necessary to ensure all elements required for an efficient and effective beef cattle breeding improvement programme are in place in Ireland. Initiatives in beef breeding undertaken over the year include:

- **Data collection systems.** ICBF's "animal events" initiative provides a simple well-integrated system for use by cattle farmers to collect all the data required from farms for beef cattle breeding. Since dairy farmers will also use the same system many economies will be realised. The "animal events" system has been designed for use by pedigree beef breeders as well as herds participating in progeny testing and even by suckler herds and beef finishers. This system is now being used by dairy farmers and is being used to record events for beef animals in these herds.

- **Data storage systems.** The ICBF database development will provide a comprehensive and tightly integrated system for loading, maintaining and accessing all the data required for beef cattle breeding. The database development has been divided into two phases with dairy cattle being loaded first and AI and beef cattle data second. In both cases the database will be closely linked with DAFRD's calf registration and CMMS systems in order to ensure the removal of duplication and more importantly the widespread availability of genetic information for beef cattle. During the year the IRIS system has been expanded to accommodate beef performance recording information. Implementation is expected to proceed in the next year.
- **Standardisation of traits.** With Ireland's mix of beef breeds it is imperative that the scales used for measuring beef traits provide data that can be used both to make comparisons within as well as across breeds. The main development over the last year has been the adaptation of the linear scoring systems used in the Limousin and Charolais breeds for use in all beef breeds and crosses. A number of inspectors have been trained in the use of the resulting system, which is now being used routinely on all bulls tested through the Central Performance test at Tully and all progeny of bulls undergoing AI progeny testing.
- **Revitalising Tully.** The Simm and Amer report identified the Central Performance testing centre at Tully as having considerable potential to make a much greater contribution to beef cattle breeding in Ireland. Working with full cooperation and support from DAFRD, the current operators of the Tully facility, ICBF has taken initiatives aimed at firstly ensuring the best bulls enter Tully and secondly the best bulls from Tully get used widely through AI. Breed associations are playing an important role in ensuring only the best bulls enter Tully while marketing initiatives are being taken to ensure AI organisations in Ireland make full use of the best bulls tested at Tully. In recognition of the need for a customer focused operation and financial viability a number of changes to the funding and operation of Tully have been initiated.

  An open day was held at Tully in January 2002 to provide beef breeders with an opportunity to gain a better understanding of the function of this centre. It was attended by some 2000 mainly suckler herd owners and based on feedback from those attending will be repeated in futures years.
- **Genetic evaluations.** During the year negotiations with several international partners and suppliers of expertise have been largely finalised for the development of both a European and worldwide beef genetic evaluation system. This system has the potential of providing Irish farmers, regardless of the breed they are interested in, with the best possible genetic evaluation for traits of economic importance. While this strategy will take some years to realise a number of incremental improvements have been made to the genetic evaluation systems currently operating for AI bulls, for pedigree cattle and for Central performance tests.
- **Synchronisation**

During the year the Board established a sub-committee to investigate and make recommendations on the subject of synchronisation as a tool to facilitate the use of artificial insemination in beef suckler herds. The sub-committee reached the following conclusions:

a) A beef suckler herd under Irish conditions is required to calf at 365 day intervals.

b) AI is a powerful tool for accessing genetically superior bulls over those available and affordable for use through natural mating.

c) Successful AI requires a combination of good facilities and good heat detection coupled with the availability, at a reasonable price, of semen from genetically superior bulls.

d) The main benefits of synchronisation are the potential to reduce the amount of labour required for heat detection and the labour required for cattle yarding.

e) The main disadvantages of synchronisation are the cost of drugs, the reduced availability of effective drugs due to concerns about risks posed to human health and the comparatively lower conceptions rates of synchronised cows.

f) Even with the most successful synchronisation program currently available there is still a requirement for either follow-up AI with conventional heat detection or the use of a stock bull. That is, there is currently no synchronisation system that achieves a pregnancy rate sufficient to allow synchronisation and associated AI to be the only reproductive technique for use in commercial suckler herds.

g) There are synchronisation programs that do not rely upon the use of any currently prohibited drugs. These programs either rely on the use of prostogladins or on the use of progestogen and GnRH.

h) Tail painting is an effective tool for improving the efficiency of heat detection.

i) Vasectomised bulls with chin-ball harnesses are efficient detectors of heat.

j) An economic analysis of the currently available alternatives shows that:

- The net cost of producing a weanling is lowest where a “good” AI bull is used in conjunction with heat detection by a “teaser” bull.
- The major cost for natural mating is the purchase and feeding of a stock bull.
- Allowing for the cost of labour reduces the comparative advantage of AI over natural mating.

k) Natural mating has limited flexibility to introduce a number of different breeds or strains into the beef breeding program. Natural mating is of no value for progeny testing for the range of herd sizes found in Ireland. In these respects AI is much superior.

l) The potential to reduce the cost of synchronisation through bulk purchasing of drugs and the use of less expensive labour in their administration is not sufficient to make synchronisation more economically attractive than any of the non-synchronisation options considered for AI.

The correct use of tail painting (left) or a vasectomised teaser bull fitted with a chinball harness (right) are extremely use full in identifying cows in heat.

The work of the sub-committee members Doreen Corridan, Bernard Eivers and Liam Heverin and the contributions of TEAGASC specialists Michael Diskin and Joe Sreenan in completing this work is gratefully acknowledged.

5.3 Dairy Breeding Objectives and Breeding Scheme Design

A two year project to further enhance the EBI was initiated during the year and a contract for the work was awarded to a consortium lead by Dr Roel Veerkamp of the Dutch research organisation ID-Lelystad. Enhancement to the EBI implemented in February 2002, following consultation with the cattle breeding industry included:

- Use of first three lactations survival vs first lactation survival.
- Use of linear type and milk yield as early predictor of calving interval and survival.
- Use of lactations in progress to get early predictions of calving interval and survival
- Proofs for calving interval and survival for foreign sires with comparable information in other countries.
- Introduction of reliability figure for EBI.
- Update of genetic base for calving interval and survival to reflect current population.
- Improvements to active bull list including country of origin and restriction to bulls free of known genetic defects.

6 Relationship with TEAGASC

ICBF is working closely with TEAGASC's research, extension and educational groups. During the year specific activities included:

- A major commitment by TEAGASC in developing a training program and providing training to farmers in the use of the new animal events system. That dairy farmers have adopted this system so widely is due in no small part to the success of this program.
- Collaboration with the TEAGASC in researching, implementing and informing farmers in relation to improvements to the EBI for dairy cattle breeding.
- Collaboration with TEAGASC in the design of research programs to evaluate alternative breeds of dairy cattle. As part of this collaboration a specialist from the Dutch organisation IDO/DLO, Dr Luc Janss was contracted to provide advise on alternative experimental designs.

- TEAGASC researchers worked with the subcommittee established by the Board of ICBF to evaluate the role of synchronisation technology in cattle breeding.
- A meeting was held at Grange at which TEAGASC's beef research program was explained to representatives of ICBF's beef breeding members.

7 Publications

7.1 Irish Cattle Breeding Statistics

Irish Cattle Breeding Statistics was published for the second time in June of 2001. This publication brings together statistical information on all aspects of cattle breeding and has been well received by the cattle breeding industry.

7.2 Industry Presentations

ICBF's staff has continued to be heavily involved in presenting information to the Irish cattle breeding industry through a range of meetings and conferences. Presentations have also been made to international conferences in Hungary and the USA.

7.3 Web Site

The ICBF web site (www.icbf.com) continues to provide a range of information to Irish farmers and the cattle breeding industry.

8 Future Prospects

Over the next twelve months the main focus for ICBF will continue to be the database implementation project. While a large amount of work has been completed the focus is on ensuring herd book and milk-recording services meet the expectations of service providers.

The current structure of services for beef cattle breeding require substantial review in order to substantially increase the level of beef performance recording. This is a prerequisite to using the features of the database to facilitate more rapid genetic progress in the national suckler herd.

The database will provide benefits through the removal of duplication as well as improving the quality of the data available for cattle breeding decision making.

As soon as the database is operational ICBF must shift its focus on to increasing the number of cattle involved in keeping the records required to support an effective cattle-breeding programme. Increases of the order of 100% are required for dairy cattle of 500% to 1000% for beef cattle. Only when these increases have been achieved will Ireland be in a position to realise rates of genetic gain competitive with the best cattle practices world-wide. Clearly this will be a major challenge and it will only be achieved if the cattle breeding industry takes full advantage of the infrastructure being established by ICBF. The challenge for ICBF is to ensure the infrastructure is so efficient and effective that the wider cattle breeding industry uses it comprehensively to deliver "world best" cattle breeding services to Irish cattle farmers.

9 Support

ICBF wishes to acknowledge and express its appreciation for the support and cooperation received from a large number of individuals and organisations. The collaborative nature of ICBF's activities depends to a large extent on the good will of its membership, the wider agricultural community and cattle farmers. This good will has been expressed in a number of specific ways including:

- Provision of sponsorship for a range of activities including the National Cattle Breeding day, the Tully Open Day and the Animal Events notebook.
- Cooperation in the development of the animal events system as provided by DAFRD, the owners of the herds that participated in the pilot scheme, NTT in the development of the printed material and SWS who ensured a smooth start to the operation.
- Support by many organisations and individuals during the database implementation including Irish Holstein Friesian Association who have undertaken a major change in their operation, and the Milk Recording service providers during a change-over that has yet to be completed.
- Support during the design, introduction and enhancement of the EBI has been provided by ICBF's AI members, private AI companies, TEAGASC and many farmers.

These many acts of support are gratefully acknowledged.

Brian Wickham
Chief Executive

John Malone
Chairman