

ICAR TECHNICAL SERIES No.2



Sub-Regional Office
for Central and Eastern
Europe



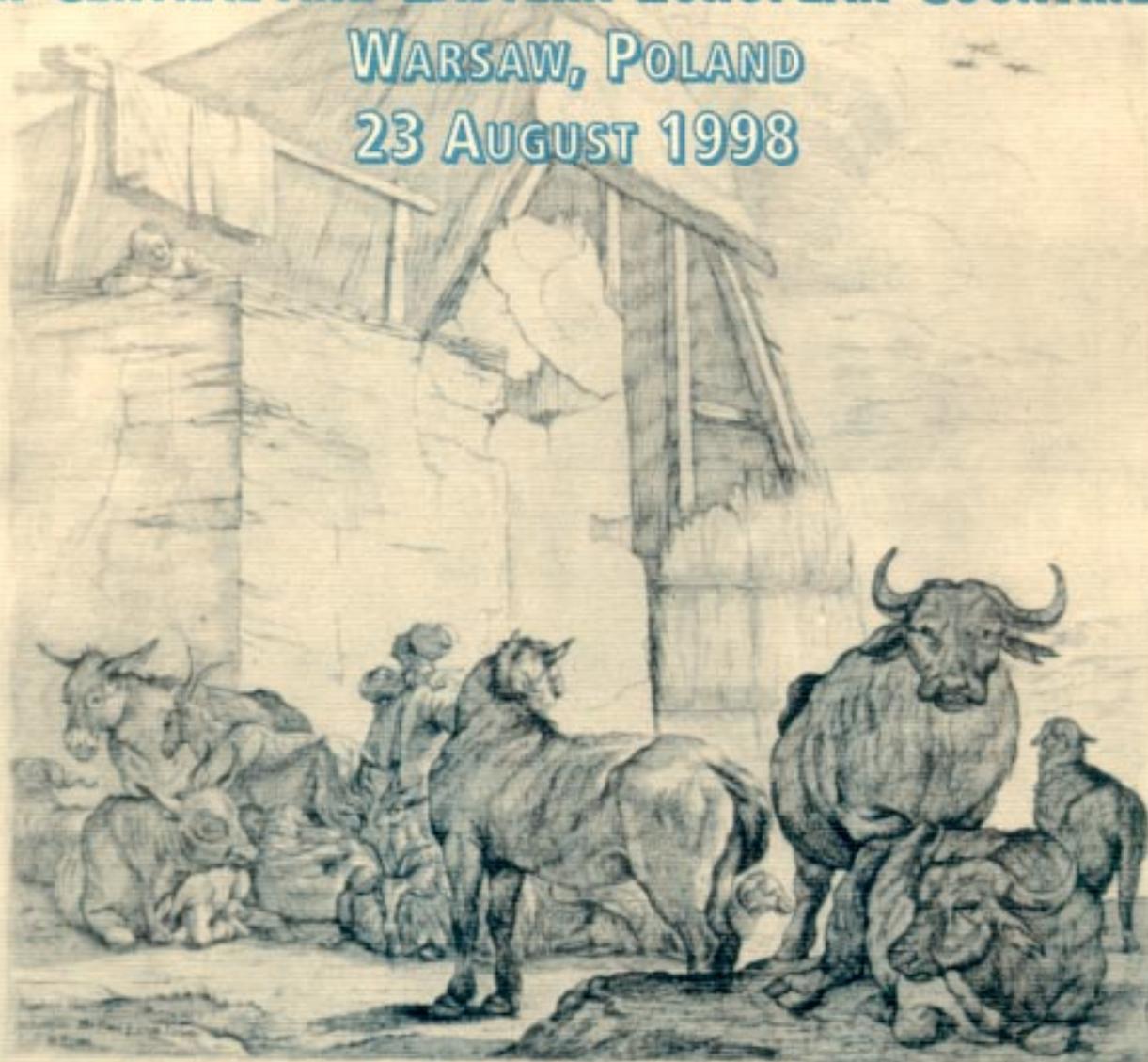
CEEC
Contact Group



CATTLE IDENTIFICATION AND MILK RECORDING IN CENTRAL AND EASTERN EUROPEAN COUNTRIES

WARSAW, POLAND

23 AUGUST 1998



*Nelle zone di Arlem e Montpel Bamberie non solo la struttura del corpo, ma di cui passò
inferiore era un 6° più lungo della superiore, frange di piume e corte di collo, ma annesso
bisogna di colore Cocco, animali, Sugary, Carcoriz. L'anno 1619, parte d'Italia e la Sabina.
Abecedario.*

EDITORS: T. VARES, M. ZIALIC & C. MOSCONI

MAY 1999

Cover page: 17th century engraving by Pieter Jacobsz van Laar of Haarlem, dit Bamboccio, (1599-1642), representing a livestock farm in the Latium region of Italy.

The International Committee for Animal Recording wishes to express its appreciation to the Ministero per le Politiche Agricole and to the Associazione Italiana Allevatori for their valuable support of its activities.

**Cattle Identification and
Milk Recording in Central and
Eastern European Countries
Warsaw, Poland
23 August, 1998**

Editors: T. Vares, M. Zjalic and C. Mosconi

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Table of Contents

Preface <i>J. Crettenand</i>	1
Introduction <i>T. Vares</i>	3
ICAR: A worldwide organisation for standardisation of animal recording and evaluation <i>J. Crettenand</i>	5
Cattle identification and registration <i>J. Hodges</i>	17
General trends of data processing in CEE countries <i>J. Claus</i>	27
Cattle identification and milk recording in Albania <i>D. Mati, N. Tahiri, F. G. Santini, A. Kipi</i>	33
A system of quality control of milk in the Brest Region of the Republic of Belarus <i>I. Kyssa</i>	39
Identification and milk recording of cattle breeding in the Republic of Bulgaria <i>V. Vafilev</i>	43
Performance review of cattle breeding and selection work in Croatia (cattle identification and milk recording) <i>M. Ernoic, & A. Kljujev</i>	47
Cattle identification and milk recording in the Czech Republic <i>F. Urban</i>	51

Development of milk recording services in Estonia <i>T. Murulo</i>	55
Data processing and computer developments of milk recording in Estonia <i>K. Pedastsaar & T. Murulo</i>	63
Milk recording in the service of herd improvement, quality milk production and herd management in Hungary <i>G. Lejtényi & G. Mészáros</i>	71
Development of identification and registration in Hungary <i>L. Zsilinszky & S. Sebestyén</i>	79
Brief review of animal recording in Latvia <i>A. Stasans</i>	89
Activities and management of milk recording and identification in Lithuania <i>A. Svitojus & P. Doubravsky</i>	93
Milk testing system organisation in Lithuania <i>R. Petruskevicius & A. Svitojus</i>	99
Situation of milk recording in Poland <i>D. Krencik</i>	105
Milk recording and cattle identification in the Slovak Republic <i>S. Ryba</i>	111
Cattle identification and milk recording in Slovenia <i>J. Pogacar, M. Klopčič, F. Habe</i>	117
Concluding remarks <i>M. Zjalic</i>	125
List of participants	130

Preface

In its half century long history, ICAR has been confronted with various problems and challenges stemming from changes in the environment in which its members operate. ICAR member organizations from Central and Eastern Europe are going through the process of transition and adaptation to market economy conditions. Changes in the animal production sector, such as the emergence of new farm structures, privatization of production assets, liberalization of foreign trade and changes in the role of state in national economy have imposed a need not only for adaptation but, in many cases, for radical transformation of methods of work, organizational forms, financing as well. The process started some ten years ago, and still there are many things to be done in order to make the work of our members more efficient and competitive. Experiences gained by West European organizations and services can be of a great help to our members from CEE countries in developing their own models and approaches in order to meet actual and future needs of their clients.

In addition to specific problems relevant to animal recording, national recording services and organizations in CEE countries are confronted with the new requirements regarding animal identification. However, in this field they are in almost the same position like their West European colleagues: there is a general need to avoid duplication of efforts (and costs) and to introduce systems of life-time identification which would be equally compatible with breeding, management and health purposes.

Bearing in mind the fact that animal recording represents a base of development of livestock production at national and farm levels, any improvement in quality and efficiency of recording is directly reflected in the efficiency of the sector as a whole. By supporting its members to find their place in the new environment, one can say, not without satisfaction and pride, that ICAR has played an important role in restructuring the animal production sector in CEE countries. Results attained are mainly due to the universality of ICAR as a world-wide organization. In these unprecedented circumstances, ICAR's guidelines and recommendations have proved to be viable and universally applicable ensuring a satisfactory degree of uniformity and a maximum of flexibility in the choice of methods.

This Round Table Workshop on animal identification and milk recording in Central and Eastern European countries, organized in cooperation with FAO, ICAR, EAAP and the Polish Animal Breeding Service, in addition to fulfilling its basic objectives – exchange of experience and improved cooperation among ICAR members – has also contributed to the better knowledge of problems and situations in the countries concerned. Country papers presented in this publication demonstrate that ICAR member organizations in CEE countries are endowed with high technical capabilities, skills and knowledge but that they, in some cases, lack the most up-to-date instruments. However, the enthusiasm and dedication of our colleagues from CEE countries, their innovative spirit and desire to learn represent a guarantee for their further successes. ICAR, as their organization, shall always be at their disposal to help, to advise and also to learn from them.



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President of ICAR

Introduction

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Central and Eastern European countries (CEECs) in transition are making efforts to reorganise milk recording (MR) activities in order to meet international requirements for the recording and registration of animals as well as to serve the expansive needs of farmers. Twelve CEE countries are members of the International Committee of Animal Recording (ICAR); most of them joined within the last two to three years and more countries have applied to join. All countries have to follow ICAR Rules and Regulations in order to be in harmony with international standards. For most of the countries in Central and Eastern Europe (CEE), this means changes in recording routines as well as in national laws.

Dairy farmers in CEE are facing a new situation, besides improvement of dairy cattle, the MR service should support higher financial gains in herd management and improve the quality of the product. Furthermore, contrary to the past when the State fully covered the cost of the MR service, farmers must now contribute partially and their share will be proportionally increased each year. The decrease in average herd size together with the reduction in the total animal numbers, often places the MR organisations in CEECs in an oppressive economic situation.

The new European Union (EU) veterinary regulation for identification and registration (IR) of cattle and small ruminants, was introduced in 1997 and became valid for EU members as of 01.01.98. While most of the CEE countries are either to become members of the EU or trade with the EU, attempts are made to adjust national law towards EU regulations along with putting them into practice. IR practice is to be implemented as part of the Veterinary Diagnosis and Control System and will no longer be seen entirely as a part of the performance recording and breeding work. However, previously the Milk Recording Organisation was seen as the only institution to provide the IR service for farmers and breeders. The know-how and technical input on Animal ID and Herd Registration should now be incorporated with the intention of bringing the existing animal breeding recording system and database into the new national animal identification scheme required for entry to the EU.

1.0 Background

2.0 Purpose of the Workshop

- to present (conclude) the current status of milk recording, cattle identification and registration in ICAR member and non-member countries in Central and Eastern Europe;
- to introduce international standards as well as their worthy practice of implementation for milk recording, cattle identification and registration in CEE countries;
- to seek advice and recommendations in regard to the altered experiences in reorganising the MR and IR activities;
- to discuss future cooperation with ICAR.

ICAR: a worldwide organisation for standardisation of animal recording and evaluation

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In 1951 an organisation called the "European Committee on Milk-Butterfat Recording" was formed in the Hague, the Netherlands. This was the first formal establishment of an International non-governmental recording organisation.

During the following 20 years the committee was renamed several times and expanded from cows to cover sheep and goats. In 1990, two further steps were taken, to broaden the organisation world-wide and to assume responsibility for all farm livestock recordings that require international standardisation.

Finally the International Committee for Animal Recording (ICAR) was formed. In 1992, new guidelines were adopted. These were the ICAR Constitution, the International Agreement of Recording Practices and the Special Stamp Rules. (A quality label to be applied by the member organisations meeting the ICAR requirements, on their official recording documents).

At the 31st Session in New Zealand in January 1998 very important decisions regarding regulation changes were taken which will enable ICAR to face the new millennium.

The aims of ICAR are to promote improvement of farm animal recording and evaluation through the formulation of definitions and standards for the measurement of traits of economic importance by:

- 1) Establishing relevant recommendations, standards and guidelines concerning animal identification, recording of parentage, performance recording, evaluation and publication.
- 2) Promoting discussion and collaboration in all activities relevant to animal recording and evaluation.

1. History

2. Aims and functions

- 3) Promoting the use of records to assess the merit of animals and of the farm management systems both of which are intended to increase the profitability of farming.
- 4) Promoting the practical interpretation of records.
- 5) Ensuring, with the collaboration of member organisations, the proper implementation and use of the requirements and guidelines contained in the agreement.
- 6) Surveying recording organisations, evaluating new practices and arranging meetings to discuss the results.
- 7) Issuing publications on recording and evaluation practices and on the development of techniques to overcome the problems often associated with these activities.
- 8) Establishing Sub-Committees, Task Force and Working Groups, to cover specific areas of recording and evaluation which require regular updating such as:
 - a) Recording methods and standards
 - b) Standards for recording and analytical equipment
 - c) Animal evaluations
 - d) Publications and enquiries
 - e) Rules Review / membership
 - f) Other activities as the Board may determine

ICAR follows national and international legislation. Its guidelines and recommendations are to be regarded as minimum requirements set up to ensure a satisfactory degree of uniformity of recording among member countries, together with maximum flexibility in the choice of methods. If they so wish, ICAR member countries may enforce more stringent rules.

3. Infrastructure

The signing of the International Agreement is the main commitment of any member when joining the organisation. ICAR actually has 44 participating countries (Table 1).

New members must meet ICAR's requirements within two years of the signature of the agreement. They must inform the Board (his composition is given in appendix 1) on the requirements to be complied with in their country and submit an annual report.

Full member organisations are entitled to utilise the services of ICAR and attend its meetings. Full members may be entitled to use the ICAR Special Stamp.

The success of ICAR activity depends on the work of its Sub-Committees, Working Groups and Task Forces. Results are presented during the General Assembly, which is held every two years, hosted by a member organisation.

There are three sub-committees, one task force and twelve working groups currently in the structure. Details are given in figure 1.

Table 1. ICAR member countries

Argentina	Holland	Norway
Australia	Hungary	Poland
Austria	India	Portugal
Belgium	Ireland	Romania
Bulgaria	Israel	Scotland
Canada	Italy	Slovak Republic
Croatia	Japan	Slovenia
Czech Republic	Jersey	South Africa
Denmark	Korea	Spain
Estonia	Latvia	Sweden
Finland	Lithuania	Switzerland
France	Luxemburg	Tunisia
Germany	Mexico	USA
Great Britain	New Zealand	Zimbabwe
Greece	North Ireland	

The International Bull Evaluation Service (INTERBULL) a sub-committee of ICAR since 1988, is a non-profit organisation, responsible for promoting the development and standardisation of international genetic evaluations for cattle.

It achieves this through coordinating international communication and research efforts, and providing a number of services to participating countries through the activities of the INTERBULL Centre at the University of Agricultural Sciences in Uppsala, Sweden.

INTERBULL currently provides four major benefits to its member countries.

4. Sub-Committees

4.1 INTERBULL

4.1.1 Role

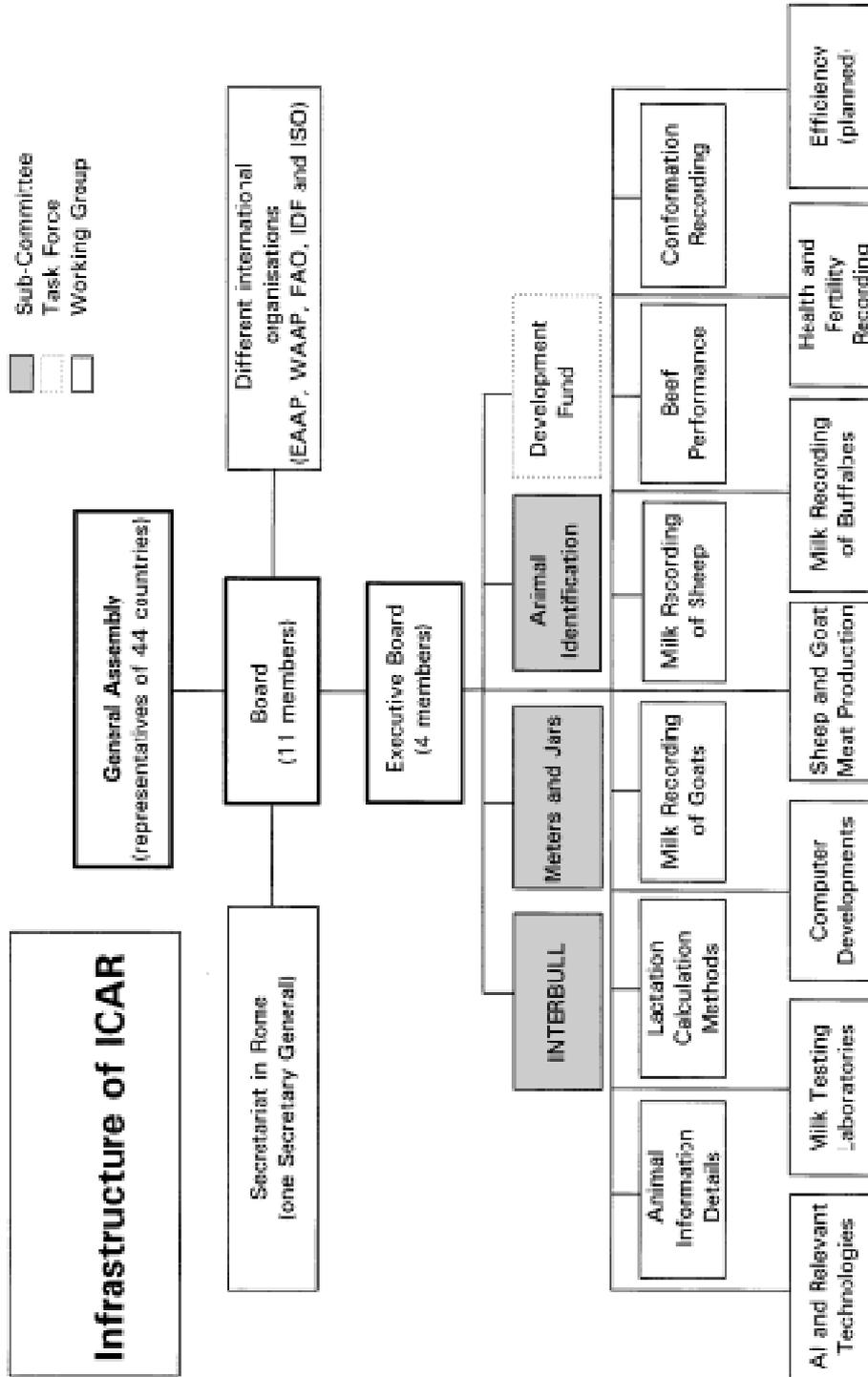


Figure 1. Infrastructure of ICAR

1. International communication

A major benefit of INTERBULL membership is the exchange of information with other member countries. INTERBULL coordinates this international communication through the use of meetings, workshops, surveys, presentations and publications (bulletins and newsletter).

2. International research & development

The INTERBULL Centre provides international leadership in researching and developing methods for generating international genetic evaluations. It achieves this through coordinating and reviewing research done in member countries, as well as running its own research program.

3. International genetic evaluation service

The international genetic evaluation service provided by the INTERBULL Centre calculates routine international genetic evaluations for cattle with a scientifically advanced method known as Multiple Across Country Evaluation (MACE). Over 20 countries currently subscribe to this service.

4. International technical support

INTERBULL provides member countries with advice and assistance on all matters relating to the genetic evaluation of cattle. This includes guidance for countries developing joint evaluation or recording schemes, and recommended codes of practice for national evaluation systems.

Through the benefits of combining research and information from around the world, INTERBULL contributes to greater genetic progress for all its member countries.

Participating countries receive the benefits of INTERBULL through payment of annual membership fees. Additional service fees are charged for countries using the international genetic evaluation service.

INTERBULL will continue to provide a world focus for communication and research on international genetic evaluations for cattle.

The INTERBULL Centre has been recently appointed by the EU as the reference body for the across-country genetic evaluation of European cattle. In addition, international genetic evaluations for several non-production traits (conformation, health and fertility traits) are planned for the future.

As the number of member countries increases, INTERBULL will be placing greater emphasis on expanding its range of services and benefits to meet these extra needs.

4.1.2 Benefits

4.1.3 The future

4.2 Meters and Jars

4.2.1 Objectives

According to its terms of reference, the sub-committee covers the following fields of activities:

- Preparation of updates of the document „The approval and checking of milk recording equipment“ as part of the ICAR Guidelines.
- Survey of the situation of routine checks of approved meters and use of the provisionally approved meters in member countries.
- Stimulation of new developments and report on new equipment procedures and methods for milk recording.
- Advice ICAR Board on approval and/or certification of equipment, procedures and methods concerning milk recording and test centres.

4.2.2 Test centres

Five test centres are approved by ICAR for the carrying out of the tests. They are in the following countries: The Netherlands, Denmark, Italy, USA and France

4.2.3 Actual milk meters

Actually 14 milk meters are approved by ICAR and 10 are provisionally approved. One recorder jar and the sampling device „Shuttle“ of Lely working on the milking robot Lely are under test.

Since November 1996 six new milk meters were provisionally approved. In 1998 the tests of two new milk meters and one recorder jar should be started. The interest of the manufacturers in an ICAR approval of their meters or jars is very large due to the fact that only data of approved milk recording devices are accepted for official milk recording purposes.

4.2.4 Future activities

The Sub-Committee will in the next two years work especially in the following areas:

- Investigation concerning a new statistical treatment of farm test results
- Survey of the milk meters used for goats and sheep
- Update the procedures for the approval of recording jars
- Update the procedures for the approval of milk recording equipment for goats and sheep
- Improve the relationship between the Sub-Committee, the test centres and the manufacturers
- Use of robotic milking system and consequences for the milk recording

Unique identification is a basic requirement for all activities where individual animal recognition is necessary, for example:

- farm management
- animal recording
- animal breeding
- animal health
- purposes of trade
- control of subsidies etc.

For farm management purposes it is only requested that the code is unique within the farm. For all other activities national uniqueness is required. With growing exchange of animals from farm to farm even across national borders, uniqueness of the numbering systems used to identify individual animals is of great importance. For many years, ICAR has had the responsibility for identification systems used in animal recording. Consequently, a Working Group on Animal Identification and Registration was inaugurated some years ago by the Board of ICAR. According to its terms of reference, the group covers the following subjects related to identification and registration:

- Preparation of guidelines for the relevant appendices of the International Agreement of Recording Practices
- Stimulation of new developments in and report on new equipment, procedures and methods dealing with
 - a) Electronic identification
 - b) Other identification devices
 - c) Standard layout of eartags for individual animals
- Advice ICAR Board on approval and/or certification of
- Institutes serving as ICAR test-centers
- Identification devices used in individual animal identification

At the 31st ICAR Session the Working Group Identification and Registration was split in a Sub-Committee Animal Identification and a Working Group on Animal Information Details.

The work of the group was very much occupied by the elaboration of two guidelines concerning individual animal identification:

- Granting and use of a manufacturer code for ISO compliant transponders
- Performance evaluation and approval of official identification devices

**Based on the report of the Working Group on Animal Identification and Registration given at the 31st Session in New Zealand.*

4.3 Animal Identification*

4.3.1 Introduction and objectives

4.3.2 Actual and future activities

The first of the two guidelines currently under discussion deals with radiofrequency identification (RFID) devices and comprises the description of the procedure for the application of a manufacturer code as well as the respective test procedure. The document has been finished by the group and was submitted to the ICAR Board to be prepared for official voting by the ICAR member countries.

The second document dealing with the description of procedures for laboratory and field testing of all kinds of identification devices used in husbandry and companion animals is still in discussion.

In an early stage of the draft document, only electronic identification devices were taken into consideration. Meanwhile, the group received a lot of requests from ICAR member countries asking for tests to be performed on conventional eartags too.

For each kind of identification device a separate part has to be elaborated. Currently, draft documents for electronic tags, readers and conventional eartags are in preparation. As soon as the group has finished the proposals, they will be made available to the industry for further discussion.

5. Publications

Every two years the proceedings of the biannual meeting are published. The Constitution, Special Stamp and the International Agreement of Recording Practices are also published with its guidelines and regularly updated. A newsletter is published two to three times a year and circulated to all member organisations and to other organisations and individuals interested in the work of ICAR.

6. Funding

ICAR is a non profit making international association which depends on the annual fees calculated on the base of a basic contribution depending on the recorded species and a variable amount depending on the number of recorded animals.

ICAR offers special services exclusively reserved for its full members, the payment of contributions depending on the requested service. Among them, the most important is the use of the ICAR Special Stamp, the certification of approved equipment and devices concerning milk recording practices or animal identification, through laboratory and farm tests in ICAR authorised laboratories and organisations, and the granting of certificates.

7. Future strategy of ICAR

Today livestock farming world-wide is in a difficult position. Pressure on income is coming from both, reduced government support for prices and increasingly free and global market in goods and services. The member

organisations must change their strategy to fulfill the needs and wishes of the farmers. ICAR is best qualified to provide member organisations with information, guidelines and services in a professional way.

In developing a long term strategy plan covering all the activities of ICAR, including the activities of INTERBULL and its Centre, the following points should be considered:

1. ICAR must take world-wide the leadership for standardisation of animal recording. It should be an international organisation covering all aspects of registration, recording and evaluation of data for cattle, sheep and goats. In the future ICAR activities could be extended to include additional species.
2. ICAR should help to improve the quality of the total process of recording and evaluation. Improvement of both management and breeding records must be achieved. New ICAR recommended quality assurance systems could extend the range of assurance options available and could lead to changes in the current rules for granting and for the use of the Special Stamp.
3. The structure of ICAR should bring more flexibility to decision making. The recent changes in the Board and the establishment of an Executive Board are the first steps in this desirable direction.
4. ICAR's financial and fiscal position will be properly ensured by the registration as a non profit international non governmental organisation (INGO).
5. ICAR should follow a growth strategy to attract members from new countries specially from Central and Eastern Europe, South America, Africa and Asia.
6. ICAR should work closer with other international organisations dealing with animal recording. The recent changes of the Constitution are a first step in this direction, allowing the World Breed Federations to become full member organisations.

I am confident that the future strategy of ICAR will be successful thanks to the active support of the member organisations. The current and new services of ICAR will allow the member organisations to prepare themselves for the new competitive conditions for the benefit of their farmers and breeders.

Appendix 1

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Cattle identification and registration

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Firstly, the paper briefly summarises the historic development of cattle identification and registration systems in European countries for milk recording, breed registration and genetic improvement.

Summary

Secondly, the Council decisions by the European Union (EU) on this topic over the last fifteen years are described. These Council Directives in the 1980s broadly defined the principles to be used in the national systems of Member States. More recent Council Directives with more strict and precise requirements arise because of concerns about animal health diagnosis and control. Following negative animal and human health experiences with cattle in the 1990s, these Council Directives have tended to specify in more detail than before, the precise standards for cattle identification and registration that must be installed by each EU Member State. In addition, the Council Directives provide for fuller integration between EU Member States of both systems and information flow on cattle identification and registration, together with requirements for sanctions when these standards are not applied adequately.

The Commission Regulations for interpreting and implementing the Council Decisions are given. In addition, the dates by which the several stages of development must be implemented, are defined.

It is important to understand that the motivation behind these EU decisions, which are binding upon Member States, is the threat of animal disease and the associated human diseases which are linked to the movement of cattle both within and between EU Member States and also in cattle movements involving the EU and Third Countries.

It may be noted that the Council Directives and the Commission Regulations for cattle identification and registration are accompanied by matching decisions for some other species of domestic livestock and also for the identification and movement of beef and beef products involved in trade within and outside the EU. These decisions are not described here where the focus of interest is upon cattle.

Since this paper is for Round Table participants from Central and Eastern European countries (CEECs) who are concerned mainly with milk recording and cattle improvement, the paper addresses some issues which are likely to arise in those countries when seeking to adopt EU standards. Each country is different. Nevertheless, in each there is a well established and effective cattle identification and herd registration system used on a sub-set of the national cattle population which has been developed over many years on a local, regional or national level and which usually serves the cattle breeders, milk recording members, artificial breeding organisations and in most cases, also the Ministry of Agriculture. In some cases, this breeders' animal identification system is used for animal health and movement control purposes. In other countries there may be a separate system for animal health. The paper seeks to address the principles which will be involved in rationalising the national cattle identification and herd registration system in CEE countries, into one which meets EU standards. Individual answers are likely to be needed in each country.

Historic Background

Historically, in most European countries the first cattle identification systems were developed for the purpose of milk recording and pedigree registration. Such systems generally served only a sub-set of the national cattle population whose owners were interested in improved management, sales of breeding animals and genetic improvement. Often, but not always, the same animal identity number was used for these three purposes, though historically in some countries a cow might have had separate numbers for each of these purposes: milk recording, ancestry recording and genetic improvement by artificial breeding.

European countries developed and maintained their own national and sub-national systems for the identification of their cattle. While these systems were based upon common principles, operationally they differed both in the type of mark used upon the individual animal, in the numbering system and also in the way the data was created, transmitted, stored and accessed. In some countries, identification systems varied in different areas of the country and sometimes varied according to the breed, type or class of cattle. Quite commonly there have been several systems within a country, each of which has been designed over long periods of time for different specific purposes. It may be recalled that nearly all these systems were established originally with hand written records and printed herd books. In the last forty years, milk recording, animal identification and herd registry data have been handled electronically. Considerable experience has been built up in these areas, although again it has to be emphasised that, although milk recording standards have been agreed internationally through the activities of ICAR, each member has established its own unique system of data handling, storage and access. CEE countries which are now members of ICAR, have only joined in relatively recent years and some CEE countries are not yet members.

In recent decades, European countries have increasingly wished to identify all their cattle individually and not only those which were milk recorded or registered in a pedigree herd book. This wish to identify all cattle in a country has generally been stimulated by animal health concerns such as the national plans to eradicate certain animal diseases, like tuberculosis and brucellosis. To ensure that all cattle are identified, governments have often introduced new systems. Sometimes these have used the existing milk recording ID number where it existed, supplemented by a second system for animals not in a milk recording system. In other cases, a new and separate national cattle ID system was introduced for specific animal health control purposes.

So although each European country has been motivated by the same objectives, cattle identification systems have had distinctly national characteristics. Some attempts were made by cattle breeders with interests in international trade in breeding animals to rationalise their cattle ID systems, but even when this was successful, it affected only a small percentage of the national cattle population in a country.

The development of the European Community and its evolution into the European Union with the aim of completing the internal market, put the issue of cattle identification on the agenda in Brussels. Live cattle are involved in intra-community trade and it became clear that they had to be identified in accordance with the requirements of the Community so that the original or transit holding centre or organisation could be traced. Furthermore, there was the need to ensure that cattle entering the Community from third countries be subject to veterinary checks for which an approved system of animal ID was needed.

An early stage was a Council Regulation as long ago as 1981, which established “mutual assistance between the administrative national authorities of the Member States and cooperation between them and the European Commission”. This approach essentially recognised that Member States had differing systems of cattle identification and required them to work together in ensuring that cattle and other species of livestock, were identified when passing from one state to another.

However, in the period 1989 to 1991, the European Community requirements were specified more precisely in several Council Directives to ensure the correct application of legislation on veterinary and zootechnical matters. In particular in 1992, (Council Directive 92/102/EEC), keepers of animals in Member States were required to maintain up-to-date records of the animals on their holdings; persons involved in the commerce of animals had to keep records of their dealings and the competent authorities had to have access to these records on request. This Directive set out the minimum requirements for the identification and registration of animals, defined holdings and livestock keepers as those

responsible for animals, even on a temporary basis and defined the competent authority as the central authority of the Member State responsible for the veterinary checks.

**Requirements
in 1992 of
Council
Directive
92/102/EEC on
the
Identification
and
Registration of
Animals***

1. The competent authority must maintain a national register of holdings.
2. Each keeper to maintain a register with the number of cattle; this is to include an up-to-date record of all births, deaths and movements with dates.
3. Keepers to maintain records of origin, identity and destination of animals.
4. Keepers to provide a document with details of animals when they leave the holding.
5. Identification marks to be applied within thirty (30) days of birth or before animals leave the holding of birth.
6. Marks are not to be changed or replaced without permission from the competent authority.
7. When marks are lost or unreadable a new one shall be applied and the authority informed.
8. The eartag used shall be approved by the national competent authority.
9. The eartag shall have a numeric code of not more than fourteen (14) characters which will indicate the individual and the holding where it was born.
10. Animals entering from third countries shall be given a national mark, unless the animal is imported for slaughter within thirty (30) days.
11. The new number on an imported animal must be linked with the number from the country of origin.

**Further
Specific EU
Council
Regulations
for Cattle-1997**

The 1992 regulations, summarised above for cattle, were an attempt to meet the European Community's requirements for veterinary health and for trade in cattle by using the Member States' own national cattle identification systems. It must be remembered that these national systems varied and in some cases, while covering all cattle in a country, used several systems.

A new and urgent look at the situation was provoked several years ago by an outbreak of Foot and Mouth Disease (FMD) in Italy which was eventually traced to cattle coming into the European Union from a country to the east. However, the route of the infection and the cattle carrying it were difficult to trace. This highlighted the fact that the cattle identification system needed to be strengthened to support the implementation of effective animal health veterinary controls across the whole EU. Further

**Note the Council Directive applies to several species of livestock while the following extracts relate to the requirements for cattle.*

pressure was experienced from the realisation that bovine spongiform encephalopathy (BSE or Mad-Cow Disease) in the UK was associated with Creutzfeldt-Jakob Disease (CJD) in humans and the European Union placed a ban upon the export of cattle and beef from the UK.

Thus, as a result of these pressures for more adequate animal health controls in the EU, it was apparent that a more strict and well-defined identification system was needed for cattle in the EU Member States, associated with tighter controls on the movements of cattle into and through the EU Member States. Therefore, on 21 April 1997, the Council issued a new regulation, EC No. 820/97, for the establishment of a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products.

This Council Regulation defines the requirements of cattle identification for the EU as a phased programme for introduction over several years. It is a system which has to be implemented and operated by Member States, but it makes far more and highly specific requirements on the details of the system than previously. In fact, it is an EU cattle identification system which Member States must institute and operate. It replaces the previous approach when different national cattle identification systems were required to adapt to meet EU principles.

This development is extremely important for CEE countries. If a CEE country wishes to enter the EU, then it must change its cattle identification system to fit the EU system. If a CEE country does not contemplate entry to the EU in the foreseeable future, the EU cattle identification system will be important for trade in cattle, beef and beef products.

This Council Regulation recognises that the market in beef and beef products has been destabilised by BSE and seeks to improve the transparency of the conditions for the production and marketing of cattle, beef and beef products. It introduces a more efficient system for the identification and registration of cattle and a labelling system in the beef sector. This paper addresses only cattle identification and registration. It therefore amends the requirements in Council Directive 92/102/EEC of 27 November 1992 which recognises that they have not been entirely satisfactory and need further improvement. It states that excessive demands must not be placed upon the producer in terms of administrative formalities, but at the same time, feasible time limits are needed for implementation of the new requirements.

Each Member State has to create a computerised database to record the identity of animals on all holdings in its territory and the movements of animals with the aim of facilitating animal health requirements.

**Council
Regulation EC
No. 820/97 (21
April 1997) for
Establishing a
System for the
Identification
and
Registration of
Bovine
Animals and
Regarding the
Labelling of
Beef and Beef
Products**

Each bovine animal must be identified with two eartags, one in each ear and accompanied by a passport determined on a community basis. The eartag must be permanent throughout the animal's life. Animals coming in from third countries are subject to the same identification requirements.

Keepers must maintain an up-to-date register of all animals on their holdings and the register must follow the EU system.

Member States have to bear the cost of introducing and operating these systems. The EU is examining the possibilities of electronic tagging for introduction at a later date.

The specific requirements and characteristics of the new system are:

1. Two eartags for each animal born after 1 January 1998, or intended for intra-community trade after 1 January 1998.
2. Animals born before 1 January 1998 may be identified by the previous EU approved system until 1 September 1998 after which the two tag system is used.
3. Tags to be applied within thirty (30) days of birth.
4. Animals entering the EU from a third country must be similarly identified with two eartags.
5. The original identity of an animal from a third country must be linked in the database with the new EU number.
6. Animals from other Member States retain their original eartag.
7. Eartag numbers shall be allocated to each holding by the Member State according to the requirements of the EU.
8. The computerised database shall be operational by 31 December 1999.
9. Members States will issue animal passports for each animal identified from 1 January 1998 within fourteen (14) days of the notification of its birth or, in the case of an animal entering from a third country, within fourteen (14) days of the notification of an animal arriving.
10. An animal shall be accompanied by its passport when it moves.
11. After death of the animal the passport shall be returned to the competent authority within seven (7) days or, when an animal is slaughtered the operator of the slaughterhouse shall return the passport to the authority.
12. Animals going to third countries shall leave their passports at the point of exit from the EU.
13. All births, deaths and movements to be recorded on the holding register and reported to the computer database within fifteen (15) days and after 1 January 2000 within seven (7) days.

The European Commission has issued Commission Regulations which lay down the detailed rules for the implementation of Council Regulation EC No. 820/97. These cover several important aspects of the new animal identification system for cattle.

**Commission
Regulations to
Interpret the
Council
Directive**

**Commission Regulation EC No 2628/97 of 29 December 1997 -
Transitional Provisions for the Start-up Period of the System for the
Identification and Registration of Bovines**

1. Old stocks of eartags may be used until 31 December 1999. Further specific regulations are made regarding the temporary practices in certain Member States.

**Commission Regulation EC No 2629/97 of 29 December 1997 - Eartags,
Holdings Registers and Passports**

1. The eartags should use the first two positions for the country code together with a maximum of twelve digits for identification of the animal, holding and the competent authority. A bar code may be used.
2. Eartags shall be flexible plastic, tamper proof, easy to read throughout the lifetime of the animal, not re-usable, remain attached without harming the animal and carry only non-removable inscriptions.
3. Each eartag shall consist of a male and a female part, at least 45 mm length for each part and at least 55 mm width for each part and the characters shall be at least 5 mm high.
4. Members States shall tell each other the designs of their eartags.
5. Passports shall carry the identity number of the animal, the signature of the keeper(s), the name of the issuing authority and the date of issue.
6. If any grant is payable, provision must be made for this on the passport.
7. The register shall contain the up-to-date information on the animal, the date of death, details of animals entering and leaving the holding with details of the other holdings and the dates of transfer, the name and signature of the authority which checks the register and the date this is done.

Commission Regulation EC No 2630/97 of 29 December 1997 - Minimum Levels of Controls to be Carried out for the Identification and Registration of Bovine Animals

1. The competent authority shall carry out a risk analysis especially relating to all animal and public health considerations, the number of animals on a holding, the annual bovine premium paid compared with the previous year and any significant changes over the last year.
2. If all the animals on a holding cannot be assembled within 48 hours, a sampling system shall be designed.
3. On-the-spot inspections shall be carried out covering at least 10% of all holdings per annum and these shall be based upon the risk analysis taking account of the accuracy of the records in the register and the passports.
4. Member States will make an annual report based upon the Commission model with numbers of holdings, numbers of inspections, numbers of animals inspected, breaches found and sanctions imposed.
5. This regulation shall start from 1 January 1998.

Commission Regulation EC No 494/98 of 27 February 1998 - Application of Minimum Administrative Sanctions in the Framework of the System for the Identification and Registration of Bovine Animals

1. If one or more animals do not comply with the provisions, a restriction shall be imposed on movement of all animals to and from that holding.
2. If a keeper cannot prove an animal's identity within two (2) working days, it shall be destroyed without delay under the supervision of the veterinary authorities and without compensation.
3. If requirements are not fully met, a restriction shall be immediately applied to movement of those animals only.
4. If there is a number of animals failing to comply, then a restriction shall be immediately applied to all the animals on the holding.
5. If the keeper does not pay the charges defined to support the system, then passports may be withheld and movement restricted.
6. If there is failure to report birth, death or movement within the required times, then movement of animals shall be restricted.
7. These regulations and sanctions apply as of 1 March 1998.

The regulations given for the identification and registration of bovines apply to each of the fifteen Member States of the EU and will apply to all future Members States. Therefore, instead of having to rush through changes as rapidly as the present fifteen Members States are having to do, prospective EU Member States can take a more thoughtful and planned approach.

One of the major issues facing existing or prospective Member States is the need to reconcile and combine the existing national cattle identification and registration systems already operating for breeding animals and herds, with the EU requirements for a scheme which is mainly designed for diagnosis and control of animal disease.

The problem to be faced in each CEE country is to unite existing cattle identification and registration systems for milk recording and breeding control with a new and enlarged system for all cattle in the country which meets EU requirements for animal health and movement control. In my view, it makes sense to ensure that the new comprehensive system incorporates the existing system or, is at least accessible to it through the database linkages.

This synthesis requires very detailed and thoughtful system analysis of data collection, flow, storage and access. The solution is likely to vary from country to country as the existing systems on cattle population subsets are not uniform. Nevertheless, they often represent the most valuable human resource available within the government in terms of experience, trained staff in the field, in data centres and in the ministries of agriculture.

It is important for all the branches of the government and other bodies which may be associated with existing cattle identification and registration systems, to work together to design a national system which meets the new EU requirements for Member States. Although the main impetus for the new system has its origins in animal health problems, the national veterinary services need to recognise the experience and trained personnel available in the well-established cattle improvement sectors.

The cattle improvement departments and organisations generally collect, hold and use much more data than is needed for the EU standards. Livestock improvement programmes and responsible bodies may have to change the type of mark on the animal to meet the requirements of two eartags. Thus, the database of the livestock improvement systems may have to be modified to hold different sequences of cattle identity numbers. But, it is essential to avoid a policy that completely ignores the existing livestock improvement system of animal identification in favour of installing another duplicate system. Even if a totally new system is found to be the most appropriate, linkages with the large existing databases and former animal identity numbers are important. It seems highly desirable

in the national interest to avoid an attitude that simply installs a new system without seeking the benefit of close cooperation with the existing systems. In fact, failing to bring the two systems into one will violate the EU Council Directive that the administrative burdens on the livestock producer must be minimised.

It is strongly recommended that the leader of the milk recording and livestock improvement sectors of the cattle industries take the initiatives in seeking to combine these approaches rather than seeking to maintain independence while a totally new system is developed.

There is a need for some cost benefit studies and systems analyses to be carried out on a national basis. In many CEE countries, the PHARE and TACIS programmes are able to make technical assistance and financial resources available to ensure that the EU Directives on animal identification and registration are introduced.

General trends of data processing in CEE countries

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The paper describes general trends in animal data processing for production and breeding in CEE countries. Starting from similar mainframe based computer systems of eastern origin, this antiquated technique was or is going to be replaced by a PC-based technique. There is a wide range of concepts for the replacement of the old data processing systems and the development of new concepts. The reasons for this diversity should be seen in country specific political, institutional and economic conditions.

Finally, an indication is given to strong links between a national concept for a veterinary data bank as required by EU Regulation 820/97 and data processing for animal production and breeding. In many CEE countries there is a need to develop data processing for both fields. It is proposed to link or even join both systems on national scales.

This paper generally remarks on the development of data processing for cattle production and cattle breeding in CEE countries (CEECs). They are based on consultancy projects of ADT Project Ltd (Directors: Dr Klaus Meyn and Dr Ferdinand Schmitt) in seven countries: Belarus, Estonia, Lithuania, Poland, Romania, Russia and Ukraine.

Data processing in these countries developed in different ways and at a different speed. The reasons for this diversity are described in this paper.

Until the early 1990s, the situation of data processing was more or less similar in CEECs:

- central data processing units, located at research institutes;
- equipped with IBM/370 compatible mainframe hardware of eastern origin;
- main focus of identification, recording and data processing on breeding (not on herd management support).

Summary

Introduction

The Situation in the “Old Days”

Technical equipment had limited capacity, low performance and was unreliable. Modern mainframe technology proved to be too costly if used for animal data processing only. This was the case at most locations. Consequently, changes were necessary everywhere.

PC-based technology has been regarded as suitable for the future of animal data processing in most countries. Changing computer technology implied a strategy, how and how long to continue with the old technology.

Replace concepts for the old mainframe technology

Different approaches to replace the old mainframe technology could be observed:

- “sudden death” of the whole system without alternative (loss of historical data, break in data processing);
- temporary update of mainframe technology (used hardware);
- freezing of mainframe technology.

Similar differences could be seen with regard to the development of application software on these mainframes:

- freezing of the application software;
- small improvements/adjustments;
- full use of updated mainframe power with data bank software.

General concepts for new animal data processing systems

In all countries, PCs are the basic technology for new concepts in data processing. There are basically two different concepts for the introduction of this technology:

- distributed data processing: data entry and pre-processing at several places with data exchange to and from a central data bank;
- central data processing: with or without PCs for data entry on farms/at regional offices.

Country differences can be observed in the use of data bank/application development software:

- enterprise software packages (e.g. ORACLE);
- small business software packages (e.g. Paradox, FoxPro, MS Access).

One important change seems to affect all concepts: data processing as a service for the herd management has become an important argument for further developments.

Looking to the countries, the present situation of new developments in animal data processing is widely different from client server technology; applied country wide with internet/intranet access to a central data bank;

to programmes for data entry and basic herd management reports used in test regions with all variants between these extremes. What are the reasons for this diversity?

The realisation of a new data processing concept needs more time everywhere in the world.

However, some conditions seem to be unfavourable especially in CEE countries:

- difficulty to agree on a general national concept due to structural changes in the agricultural economy (privatisation), due to structural changes of public organisations;
- limited financial resources due to limited experience to promote concepts due to limited experience to sell services due to low political/ institutional priority of data processing;
- many basic and detailed decisions: no experience with many alternatives for hardware, system software, application software, data bank design, staff training, outsourcing of software engineering, software packages or own development.

Another important factor for “unsatisfactory” progress is unrealistic time expectation.

Starting a new concept from scratch with new engineering technology, projects for complex animal data processing including genetic evaluation, have shown a need of approximately six years until full implementation:

- three years for the basic concept, staff training and building a prototype;
- two years to develop the final system and preparation of historical data;
- one year for field tests, optimisation and implementation.

Of course, time can be shortened if knowledge about animal production and breeding is combined with highly skilled software engineering on new technology. However, this situation is in most countries, not only in CEE countries, a dream.

New developments in animal data processing started on a similar basis in most CEE countries and are moving, as the country reports of this Round Table Workshop will show, towards:

- country specific concepts and solutions
 - under very different project approaches;
 - at widely different speeds.

Possible reasons for this have been mentioned before.

Limits for fast development

Key for development: personal engagement and motivation

Based on inside views into several country situations, I congratulate my colleagues for their work carried out under difficult working and living conditions, especially during the last years.

They deserved a fair chance, to make even better use of their skills and engagement.

EU Regulation 820/97 and its impact on a national animal data processing concept

EU regulations are or will be more or less the concern of all CEE countries.

EU Regulation 820/97 "Identification and Registration of Bovine Cattle and Labelling of Beef and Beef Products" is the one which has the strongest impact on national animal data processing concepts.

This regulation requires:

- an internationally unique system of farm/holding identification;
- an internationally unique system of animal identification;
- a national data bank with the content of the total cattle population:
 - a) all birth records and import records;
 - b) all movement records between holdings;
 - c) all death, export and slaughter records.

These requirements were defined to improve veterinary control, subsidy control and beef consumer confidence. However, it is obvious that the identification and all these recordings are also the base for animal production data processing. There should be no logical argument, not to link or even better, not to combine the veterinary cattle data bank system with animal production processing systems.

In building up new data processing systems for both veterinary and animal production/breeding purposes, CEE countries have the unique chance to combine both tasks into one system.

Figure 1 sketches the logical links between a data bank system according to EU Regulation 820/97 and animal production/breeding data processing.

As in many of the CEE countries, data processing systems for both national veterinary and animal production purposes, are still in the initial phase. The chance for a combined system should therefore be seriously considered.

Concept of a National System for Identification and Registration of Cattle

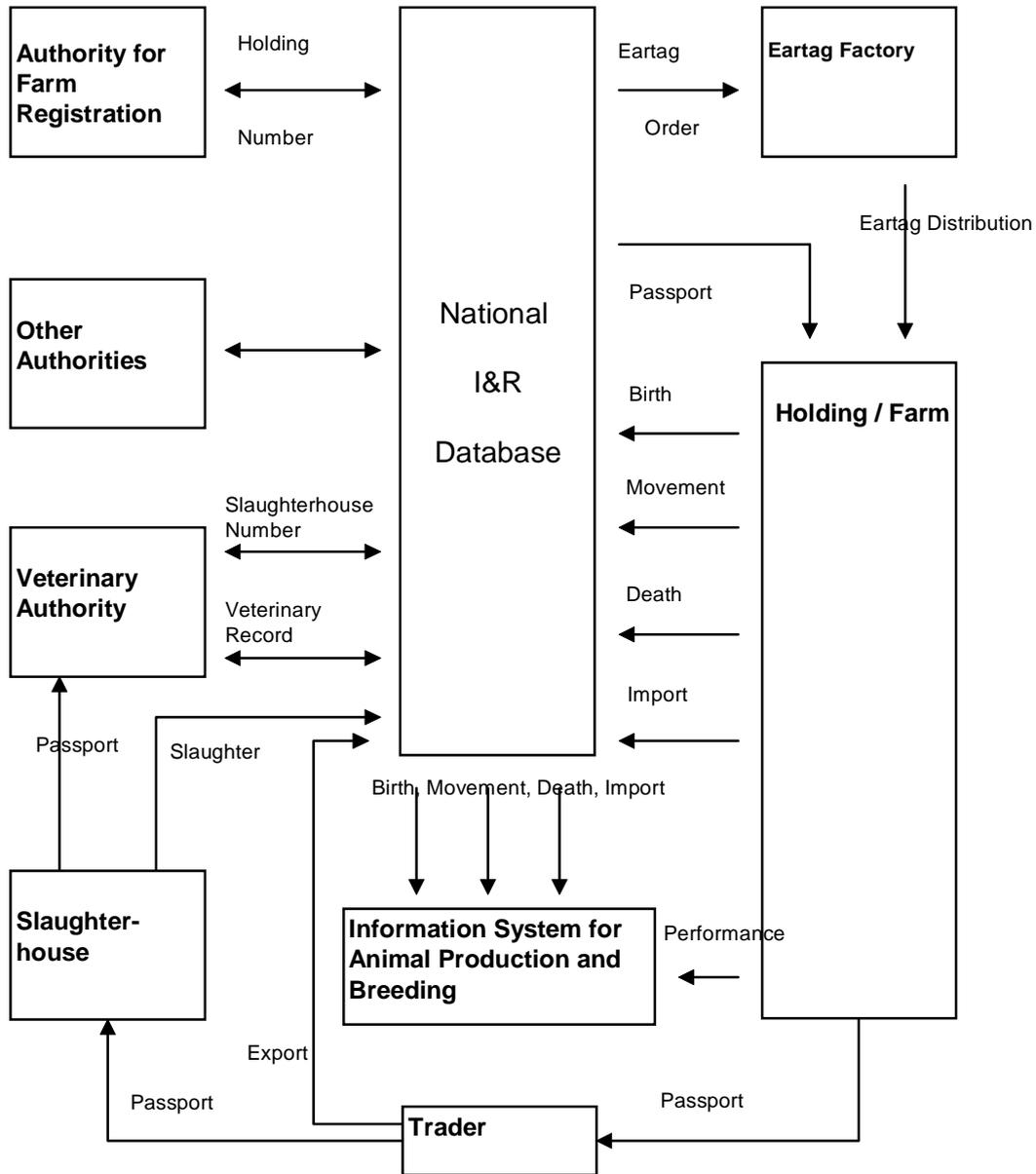


Figure 1. logical links between a data bank system according to EU Regulation 820/97 and animal production/breeding data processing



Cattle identification and milk recording in Albania

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The Government of Albania is in the process of reorganising all the technical ministries for the alignment and approximation of the national legislation to EU Directives.

The new strategy of the Veterinary Services is based on a step by step action to adapt its activities to the European Directives and Standards. The animal identification and farm registration system, starting from bovine, is a programme included in this new strategy.

This activity is in a phase of study supported by technical assistance and equipment of an Italian project, "Integrated Livestock Programme", with the purpose of implementing the system in a pilot area of the country within 1999. A PHARE programme should reinforce this action, starting in 1999, to complete the programme in all regions.

For the above reasons, we can only indicate in the following chapters, the strategy that will probably be adopted in the next months after the final approval of the Government, Ministry of Agriculture and Food (MAF) and EU Commission.

No system of animal identification exists in Albania; maybe a few old cattle (9 years old), might still have eartags of old activity carried out in State farms before the political change. Some animals (about 1 500 cattle) have been identified for animal health control (1996 FMD outbreaks); it has been suggested to remove these tags. The programme of animal movement control, information system and communication facilities must be reinforced in this phase.

Introduction

Actual situation: data on bovine sector and veterinary organisations in the field

Albania is arranged into twelve regions, thirty-six districts, 358 communities and 3 013 villages of which all administrative organisms have been codified in a numeric system according to the National Statistic Institute (INSTAT). Regions, districts and villages are codified at national level. National veterinary staff is present in all the districts covering almost 75% of the communities and activity in the villages is carried out by private vets authorised by the official of the districts.

For the whole institutional activity, the national staff is composed of 400 national vets and 800 authorised private vets.

Albania bovine population 840 000 head (1996) and the average of head/farm is very low, 2.1; for this reason and considering that animals are fed in commune areas, it could be convenient to indicate the village and not the farm, as the epidemiological unit. Table 1 summarises the global situation for the implementation of the "animal identification and farm registration system".

Table 1. The global situation for the implementation of the "animal identification and farm registration system".

Region	No. villages	No. Bovine	Bovine/village
Berat	246	53 600	217.89
Diber	288	67 700	235.07
Durres	107	53 500	500.00
Elbasan	394	107 800	273.60
Fier	282	127 000	450.35
Gjirokaster	275	39 000	141.82
Korce	350	91 100	260.29
Kukes	192	49 900	259.90
Lezhe	176	44 800	254.55
Shkoder	277	85 400	308.30
Tirane	220	73 800	335.45
Vlore	206	46 400	225.24
	3 013	840 000	278.79

In Albania no specific legislation exists which obliges the farmers to identify animals. A law, following the guidelines described in the following principal EU Directives and the Italian regulations, has been drafted by the Veterinary Service:

- CE Directive of the Council no. 102/92;
- Italian DPR no. 317, 30 April 1996;
- CE Regulation no. 820/97, 21 April 1997;
- CE Regulation no. 2628/97 of the Commission, 29 December 1997;
- CE Regulation no. 2629/97, 29 December 1997;
- CE Regulation no. 2630/97 of the Commission, 29 December 1997;
- CE Regulation no. 494/98 of the Commission, 27 February 1998;
- CE Directive 97/12 of the Council, 17 March 1997.

The proposal will be approved by the Government and then the programme will be implemented in a pilot area.

The list of persons and structures involved in the programme and their responsibility:

- farm manager;
 - public or authorised field veterinary;
 - veterinary of the community;
 - veterinary service of the abattoirs or slaughtering areas;
 - veterinary service in the districts;
 - I.K.V., Instituti Kerkimeve Veterinare, as a national centre for epidemiology;
 - veterinary service in the MAF.
-
- will record any animal movement in/out of the farm and will fill the animal passport for transport;
 - will inform, on a specific form, the veterinary service of the community for any head purchased;
 - will inform, on a specific form, the veterinary service of the community for any head sold;
 - will ask the code of the farm to the veterinary service of the community;
 - will be responsible for the farm animal database, recording any animal movement.
-
- responsible for the management of the eartags according to the needs of the community in which he/she is operating;
 - responsible to book the animals (calves or purchased in third countries) with eartags, two per head, within thirty (30) days from birth and, anyhow, before any movement;

EU Directives to be adopted

The programme

Activity and responsibility

Farm manager

Public or authorised field veterinary

- will complete all documentation, including passport, necessary for the registration of new animals and submit all the forms to the community veterinary service of the working area, informing of any variation;
- will inform the community veterinary service at the end of the farm activity.

Veterinary of the community

- will record any activity regarding the eartag management and will survey the programme in the working area;
- will send the form indicating the needs on eartags to the district;
- is responsible for supplying the eartags to the field veterinary, recording the activity;
- every fifteen (15) days, will send the documentation of the field veterinary to the district;
- is responsible for copying the animal's passport in the case of it being missing;
- every fifteen (15) days, will send the documentation of animal movement to the district;
- every fifteen (15) days, will send the documentation of animal identification (passport) received by the abattoirs or slaughtering areas;
- is responsible to assign the code to new farms;
- is charged to send any farm and animal variation to the district (every month).

Veterinary service of the abattoirs or slaughtering areas

- they will send the passport of the animal to the veterinary service of the last community indicated on the passport.

Veterinary service in the districts

- they will send the needs on eartags to the MAF;
- they are responsible for updating of the farm database in their area;
- they will receive from the communities, the documentation and will update data regarding animal identification and farm registration;
- periodically they will inform (computer diskette) IKV about any variation regarding farms and animals, using information flux and protocols established;
- they will prepare the information system with MAF;
- they are responsible for managing all information regarding the system in the area.

I.K.V.

- they will create and survey the central system;
- they will define the total information system together with MAF;
- they will ensure training and service to all the other components of the programme;
- they will produce and publish reports for MAF and the MAF authorised institutions.

- they will order the eartags;
- they will manage and direct the global system, ensuring the information throughout the country;
- they will ensure communication with the other national institutions to harmonise the different information systems.

**Veterinary service
in the MAF**

- size of the population of bovine animals: 840 000;
- number of dairy cows: 470 000;
- productivity of the dairy cows (official statistics): 1870 kg/ cow/year;
- breeds: Holstein-Friesian and Jersey (about 90% of the total cattle population); the other 10% are breeds like Tarantaise (Tarine breed imported from France), Oberiental, Simmental, etc.

**Milk Recording
(MR)**

There are no beef breeds in Albania (the number of Simmental, Charolaise is not significant).

With the contribution of the Italian project, Albania is making efforts to reorganise milk recording (MR) activities in order to meet international requirements for the recording and registration of animals, as well as to serve the expansive needs of farmers. In this regard we are accommodating ICAR Rules and Regulations to be in harmony with the international standards (changes in the recording routines as well as in the national laws).

The identification and registration (IR) system is the leading basic registration system for all other activities (herd book registration, AI information, milk recording, etc.). Performance recording and herd registration should now be incorporated as a part of the IR service with the objective of bringing the existing animal breeding recording system and database into the new national animal identification scheme required for entry to the EU.

For the time being, the MR Service exists only for a small population of Tarine breed (about 1000 cows, pure-breed or crossbred) in the district of Korca, South Albania. The MR service for this small population is provided by a research centre (State owned) with support from a French project.

MR Service

All MR services in Albania are to be established and will be provided by twelve regional centres (State owned) as mentioned in the paper. We think that the decrease in herd size per farm would bring some organisational and (particularly) financial problems. That is why we have planned to cover the MR service from the State budget and institutions during a first phase. However, our objective is to encourage and support farmer-owned organisations to take over this service. We will begin with some State regional centres where IR systems and MR services should be integrated.

Milk recording (MR) services will be provided by local offices in regional centres (twelve regional centres). From two to four districts will be covered by each regional centre (local service in each of thirty-six districts in Albania). On a central level, all activities should be coordinated by the Livestock Institution (IKZ) and Livestock Department in the MAF. The decrease in herd size (average two cattle per farm) would place the MR service in organisational and economical difficulties. Apart from assisting State institutions for better organisation of the service, the objective of the Italian project is to support farmers' associations in order that farmers can cover the increased part of the cost of the service. There is a great need to incorporate the needs of the farmers, breeders, veterinary service as well as the State.

Future cooperation with ICAR is needed to identify the most suitable practice of implementation for MR and IR systems in Albanian conditions.

A system of quality control of milk in the Brest Region of the Republic of Belarus

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The milk productivity of cows of public herds in our Region was already determined in the early 1950s immediately after the creation of collective farms. The quality of milk was determined at the same time.

Initially, the work was being done not in order to determine the productivity of each animal, but in order to determine the total, gross milk yield in the farm subdivisions. This allowed the control of the expenditure of milk for internal farm needs, for sales to the State and to other consumers. In the first years, when determining the pedigree value of the cows, the quality of milk was determined by the content of fat in milk and then also by the protein content.

For a long time this work was done with the help of manual centrifuges and simple fatmeters (buttermeters). Then the same centrifuges with electric motor drives began to be used which made the work easier.

From the mid-1970s, the functions of determining the quality of milk produced by collective and State farms (the fat and protein content) started being fulfilled by the district pedigree stations and the milk laboratories attached to the stations. The specialists on the farm did the controlling of milking and selection of milk samples and they were delivered to the laboratory by the transport that belonged to the pedigree stations where the quality of the milk was determined. The results of the studies were promptly reported to the farms. The same centrifuges were used in the laboratories.

At the end of the 1970s, new devices, which were manufactured in Denmark, were brought to half of the districts of the Region, six milk testers and six pro-milks. The first determined the fat content of the milk with the rate of up to 100 samples an hour and the second determined the content of fat and protein simultaneously with the same productivity. One specialist and three to five laboratory assistants conducted the studies. They determined the quality of milk of two to six thousand cows a month.

In the mid-1980s, other pedigree stations bought more productive devices-CZhM-1, manufactured in the Ukraine. They determined the quality of 120 samples of milk an hour.

In order to determine the quality indices more exactly and in a more centralised way, in 1987 an independent central regional laboratory which was to determine the quality of milk, was created in the village of Maisk, located in the Ivatzevich region. According to an agreed schedule, samples of milk were brought from the collective and State farms of the Region using the transport of the pedigree stations. At first, the laboratory was equipped with the devices brought from the pedigree stations and served four districts of the Region. In a year, the samples of milk were already brought from farms from all regions.

In 1988, new, more productive devices “Milko-scan605” and “Fossomatic-250/360” were bought using hard currency. The first device determined the fat content in milk at the rate of 600 samples an hour or the fat and protein content at the same time at the rate of 450 samples an hour. The second device determined the content of somatic cells in milk from 250 samples an hour.

The results of the analyses using the old devices had to be manually transferred to the statements of control milk yields, reading them from the display. New devices were equipped with a recording mechanism, but the data taken from the tabular forms also had to be transferred manually to the statements of control milk yields. That is why one had to develop and master the programme of automatic processing of the data from all devices and of the transfer of these indices directly to the statements of control milk yields.

At the present time, information about the results of analysis of the quality of milk comes to the district pedigree stations from the laboratory within a few days and from there it goes to the farms. The data on the fat and protein content are interesting, first of all, to the livestock specialists of the farms and the data on the presence of somatic cells, to veterinary specialists. That is because they are practical guides for exposing and treating sick cows.

Requirements for the quality of milk constantly become more stringent. Whereas before, when the milk was sold to the State, the fat content, mechanical contamination and acidity of milk were considered. Afterwards, its density was additionally determined.

Beginning in 1984, milk plants started to receive milk which was cooled on the farms and also with a low micro-organism content. The presence of micro-organisms in milk is determined with the help of a special reductive sample.

In the current year, new technical requirements for “cow’s milk and purchase requirements” were introduced by the decree of the Ministry of Agriculture and Food of the Republic. In this document the requirements for a number of parameters are made more stringent. Most importantly, for the first time, requirements for the determination of the presence of somatic cells in milk were introduced.

According to the new technical conditions, there should be no more than 500 000 somatic cells in 1 millilitre of highest quality milk and in milk of first and second grade, not more than 1 million.

When milk is accepted, organic leptic indices, temperature, density, acidity, cleanness, weight share of fat and also the effectiveness of thermal treatment, are determined for each lot.

Bacterial count, the presence of inhibiting substances and somatic cells in milk, is determined simultaneously at least once a decade.

In addition, there is control over the presence of neutralising substances, toxic elements, antibiotics, pesticides, pathogenic micro-organisms in milk and over the level of radioactive contamination of milk, which is coordinated with the appropriate authorities.

It should be emphasised that the production capacity of the device “Fossomatic-250/360”, that belonged to the regional laboratory, did not allow for the determining of the presence of somatic cells in milk of the cows of all farms of the Region. This became known to our colleagues from West Germany with whom we collaborate, according to the Pilot-Project which was coordinated between the Ministry of Agriculture and Food of the Republic of Belarus and the Ministry of Agriculture and Forestry of Germany.

Our German colleagues, considering our difficult situation, allocated a new high productivity device “Combi-foss,” manufactured in Denmark, to our laboratory as a part of humanitarian aid. It determines the weight share of fat, protein and the quantity of somatic cells in milk at the same time with the productivity of 360 samples an hour. Using this device, today more than 100 000 samples of milk are processed during one month with a two-shift workday. The other Dutch device processes about 40 000 with a one-shift workday, which covers more than 60% of the milch herds of the Region as a whole. That is why there is no longer a necessity to use old domestic devices. The production capacity of the laboratory at the present time allows to additionally check the quality of milk produced by the fifteen milk-processing enterprises of our Region and also by the pedigree plants of the Republic.

In the laboratory, all work is being done by a group of eleven people. Considering the economic importance of determining the quality indices of milk and the difficult financial situation on the farms, they are compensated 40% of the costs of performing this work from the regional budget.

It should be noted that there are no such laboratories in other regions of the Republic. These functions are fulfilled by the district pedigree stations.

Identification and milk recording of cattle breeding in the Republic of Bulgaria

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In the Republic of Bulgaria, the identification and milk recording of cattle breeding is controlled by the National Service of Selection and Reproduction in Animal Breeding, which organises the selection and reproduction in cattle breeding with its ten District Services of Selection and Reproduction in Animal Breeding.

Serious genetic losses have been caused due to an unexpected decrease in cattle.

The typical structure of the situation is difficult to manage at the present moment (85% of cattle are located on farms of 1-5 cows per farm). The farmers went into liquidation for their own animals and restricted their own activities.

That is why at the moment the selection, artificial insemination and veterinary servicing are becoming more complicated and are of low effectiveness. Their positive results are the main prerequisite to build the modern cattle breeding based on European unit standards.

With the decreased number of cows in the country, the percentage of the controlled and selected population logically dropped from 23.3% (during 1990 when the actual number of cows was 617 000) to 12.3% (during 1997 when the cow population was 358 000).

Cattle identification is a binding circumstance for precise identification of the correct individual control of the productive trait, correctly organised reproduction and breeding-improved work with the selected animals. In Bulgaria, the basic methods for identification are tattoo, marking with different kinds of tag-marks and cold identification with nitrogen.

Each controlled (selected) animal gets a unique eleven digit number, which is written in the stud book. The first two digits (1-28, the number is equivalent to the twenty-eight regions of the country), represent the region code. The other three digits (from 1 to 999), represent the settlement code. The next two (from 1 to 99), represent the farm code and the last four digits (from 1 to 9999), represent the stock number of the animal.

The tattooing is always made by the assistant controller no later than the fifth day from calving. The tattoo number is usually placed on the inside surface of the ear with a tattoo-pincher.

In Bulgaria, it is accepted to place the stock number of the animal and region code on the right ear and the settlement and farm codes on the left ear.

The cattle identification with eartag marking is not used very often in Bulgaria. The animals can be marked with one tag (on the left ear) or with two tags on both ears. The eleven-batch number is written on the tag with which the cattle are registered in the Stud Book.

Each identified cow's milk recording productivity is registered throughout its utilisation period which is from the first lactation to the moment when the animal is culled. In the milk recording, we keep track of the milk quantity and the percent of fat in the milk. At the end of 1998, the protein quantity was controlled. The firm ADT "PROEKT", Germany, equipped a milk laboratory with KOMBI – FOSS 360 made by FOSS ELECTRONIC, Denmark.

In Bulgaria the National Service of Selection and Reproduction in Animal Breeding (NSSRAB) is the only institution with its ten District Services for Selection and Reproduction in Animal Breeding which control milk production and provide the identification and registration for farmers and breeders.

The National Service of Selection and Reproduction in Animal Breeding accomplished the identification, registration and milk recording with the new instruction for breeding and improved work in the dairy cattle breeding since 1994.

The NSSRAB controllers are the only authorised specialists who implement the instruction. They are the only controllers who can issue the official stud book documents and generalise the information from milk recording for bulletins and catalogues, etc.

The assistant controllers make milk tests monthly over a thirty day period (A-control). Each farm has a graphic for the A-controlling test. The milk productivity test for each dairy cow is taken at 24 hour intervals.

The milk productivity is measured on a scale (BESSMER). The sum total of the milk yield from all milking during the controlling days is equal to the milk yield for the controlling day. Milk yield for the controlling day is average for the controlling period.

The average test for a milk analysis is usually taken after milking and the measured quantity should be as the milk yield for the controlling day.

The milk yield for one lactation is the sum of the milk for all of the controlling periods.

Normal lactation is the milk yield for 305 days from calving.



Performance review of cattle breeding and selection work in Croatia (cattle identification and milk recording)

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The Croatian Center for Selection and Animal Breeding (HSSC) was established by a Government Regulation in 1994 as an institution for work in selection and animal breeding in agriculture.

Introduction

HSSC is the legal successor of former forms of cattle breeding associations which were for the first time established in 1913, and this work has been continuing ever since.

The main activities of HSSC are the following:

- collecting the data in a central database of registered livestock of farm animals;
- milk recording and breeding value estimation for registered animals;
- cattle identifying and issuing of documents of parentage (pedigree);
- participating in the management of genetic resources (conservation of endangered breeds);
- planning, establishing and carrying out of breeding programmes;
- cooperating with national and international scientific and other institutions to find new breeding methods and procedures to increase the success performance of the cattle breeding programme;
- organising cattle exhibitions, reviewing and auctioning.

HSSC acts throughout the Republic of Croatia. The main executive organisation forms are district units, which are in charge of data and milk sample collections and all other selection work in the field which is congruent to the national law.

Total number and share of cows under control

The total number of cattle and number of cows being controlled in 1997 is presented in the following table:

Table 1. Total number of cattle and number of cows being controlled.

Year	Total number of cows	Number of cows under control		
		Milk recording and registration		Registration
		Ex-State sector farms	Family farms	
1997	233 207	3 602	37 109	25 096
		65 807 (28.21%)		

Source: Annual Report for 1997.

Cattle breeders of quality breeding animals make agreements with the HSSC volunteers on carrying out selection work in herds where rights and obligations are clearly stated.

Employees of district selection units collect data and send them to the HSSC via original documents or electronic media where they are deposited in a central database. Following the requirements, the data process and results are sent back to the breeders. Once a year, the results of cattle breeding and selection work on a national level, are published in an annual report.

The total number of family farms being controlled is 19 160, but the average size of herd is very small (3.25) as presented in the following table:

Table 2. Number and size of family farms in Croatia.

Total number	Number of cows in herd					
	1-3	4-6	7-9	10-12	13-15	16-more
19 160	12 613	4 731	1 125	391	164	136
%	65.83	21.69	5.87	2.04	0.86	0.71

Source: Annual Report for 1997.

The small size of family farms, dislocated small pieces of land, significantly decreases results of cattle breeding and selection work and increases expenses on controlled cows. This is the reason for recommendation that milk recording should be carried out only by breeders with five or more cows. In smaller herds only parentage (calf information) is registered.

Nevertheless, we are making great efforts to ensure that information on production results reaches all cattle breeders.

The main breeds being controlled in Croatia are presented in the following table:

Table 3. Main breeds being controlled in Croatia.

Breed	Number of cows under control	
	Number	%
Simmental	52 499	79.77
Holstein-Friesian	10 291	15.64
Brown	3 017	4.59
Total	65 807	100

Source: Annual Report for 1997

Milk production in standard lactation (305 days) of herd book cows is presented by breeds in the following table:

Table 4. Average milk production per cow in standard lactation (305 days).

Breed	Standard lactation (305 day)				
	Milk, kg	Fat, kg	Fat %	Protein, kg	Protein %
Simmental	3 740	113	3.82	121	3.28
Holstein-Friesian	5 580	200	3.58	163	3.02
Brown	3 052	109	3.57		
Average	4 143	155	3.74	122	3.27

Source: Annual Report for 1997

In 1997, 19 655 lactations were processed and the average production was 4 143 kg of milk with 3.74% milk fat and 3.27% milk proteins. In the area of performance control about 90% of cows were recorded by method AT (family farm). The rest, about 10%, were recorded by method B (ex-State farm). Control assistants according to a monthly programme have to be present on milking and on regular measuring of the quantity of milked milk and take the samples of milk from cache cow for analysis following instruction for taking and conserving samples. HSSC is in charge of the super control of assistants in the field.

During 1997, 179 269 samples of milk were analysed in HSSC laboratories on MILKOSCAN 605 equipment for quantity of milk fat, milk proteins, dry matter and lactose.

To fulfil the criteria for the Special Stamp of ICAR we will establish a neutral laboratory, which will be supervised by a reference laboratory.

For the service carried out during cattle breeding and selection work in herds (control of production, analyses of finished lactation and estimation of breeding values and issue of pedigree), breeders pay bills according to the current price list.

Work expenses of HSSC are subsidised by the Government budget by 50%, so that the price of service is decreasing to the breeder by a stated percentage.

Cattle identification

Cattle identification is the basis and obligatory part for all levels of cattle breeding and selection work. Cattle are marked in two ways; permanently (tattoo) and with eartags. The life number in the total cattle population may appear only once. The life number consists of eight digits; the first two are marking applied district and breed and the remaining six represent the current number of each animal. The current number without sign of district and breed is tattooed on the right ear until the herd book of the father is tattooed on the left ear.

The recommended yellow plastic cartage is put on the right ear. The delivery of the eartags is carried out by the HSSC and is supervised by the Ministry of Agriculture and Forestry. The subsidised price of selected eartags together with service of marking is paid by the breeder.

The male and female breeding offspring is recorded in a registration and breeding book within thirty days after birth and in the central database within sixty days after birth.

For better data transmitting and processing, our tendency is to connect the central database with district units by modem. This will give us the possibility to send information back to the breeders earlier.

Breeding value estimation

Since the 1990s, Croatia has had a national programme for breeding value estimation. The data of lactation are used for estimating the breeding value of each animal under milk control and for breeding value estimation of bulls in progeny testing of milk. The breeding values are recorded for milk yield, fat and protein yield as well as for fat and protein percentage. A BLUP SIRE MODEL will be used until the end of 1998 when we should change to a BLUP ANIMAL MODEL.

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Cattle identification and milk recording in the Czech Republic

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The Czech Republic (CR) has been a member of ICAR since 1992 and this membership entitles it to use the signature of the ICAR (authorised in 1994). Methods of milk recording approved by ICAR were respected through the whole period of the existence of the CR. At present, 526 026 cows are milk recorded in the CR, that is 95.6% of all dairy cows. Ninety-two percent of them are classified with the milk recording type A4 and 8% with the type AT according to the directives of ICAR. The average yield of recorded cows (30.06.1998) was 5 073 kg of milk, 4.3% of fat, 219 kg of fat, 3.31% of protein and 168 kg of protein.

A high proportion of milk recorded cows has been common in the CR for a long time. Besides its original function, milk recording serves as a means of animal record keeping and as a crucial source of information for the management of large herds. For this reason the whole system was from the beginning of the 1960s, an integrated one, which included animal record keeping, milk recording and all reproduction data. All data processed in the central computer are mutually connected and are further used as a source of information for farmers, breeding companies and breeders' associations. In addition, it enables an extensive inspection of reported and registered data.

Within this system (95% cows milk recorded, 99% cows inseminated), all data are transferred by organisations involved in artificial insemination and milk recording into the central data processing unit. There is only one central computer used for the whole population of dairy cows in the CR. It is operated by the company established for this purpose by cattle breeders' associations (Czech-Moravian Association of Breeders Ltd.). Milk recording and AI data are received from dairy enterprises, in harmony with regulation no. 241/91 Law Digest, by accredited organisations approved by the Ministry of Agriculture of the CR. The Czech-Moravian Association of Breeders also operates all milk analysing laboratories. From the laboratories all data are also transferred into the central processing unit.

At present, in the central computer, data from more than 500 000 cows are kept and processed. In the beginning of the 1960s, data were processed with the help of punch-cards. In the 1970s, an integrated system of milk recording and artificial insemination data processed by a central computer (ECI-1045) was initiated. As its capacity was not sufficient, it was replaced by IBM - Server type RISC 6 000. All data are processed in the system UNIX.

The standard of the milk recording method is fully in harmony with the directives of ICAR. It has been developed and issued by the Czech-Moravian Association of Breeders, i.e. with the direct participation of cattle breeders' associations. Milk recording is carried out by accredited organisations. At present, there are fourteen organisations with the legal status of joint stock companies. These organisations have created a net of subsidiaries in all districts and through them they are able to carry out the milk recording on all concerned farms. There are three systems of inspection of milk recording:

- inner inspection system of accredited organisations;
- milk recording inspectors attached to the laboratories of the Czech-Moravian Association of Breeders Ltd.;
- inspection by the Ministry of Agriculture of the CR.

The costs of milk recording are paid by farmers. The annual fee per cow is 240 - 300 CEK, i.e. the price of 30-37 l of milk is dependent on a number of recorded cows, remoteness of the farm, etc. The contribution of the Government to the total milk recording costs is 20%.

During 1998, preparations for the establishment of an overall central cattle register were carried out. The legal ground is the Law of Veterinary Care. The veterinary law thus imposes duties on farmers directed by the EU Council since 1 January 1998 within the whole EU without any exception. Explanation and individual duties of cattle keepers are laid down in the Direction of the EU Council No. 820/97 which determines a system of registration and identification of cattle with respect to identification of beef and beef products. The purpose of this measure is to ensure information on the birthplace and movement of individual animals throughout their life, i.e. from birth to slaughter. After the amendment of the veterinary law is passed, a duty for farmers will be initiated to keep an "Individual Register of Bovine Animal Keepers", which concerns all categories of cattle. During 1999 a similar system will be established for pigs and later for other farm animals as well.

With regard to the fact that most data have been recorded in the central computer for a long time, the establishment of a central register was relatively easy and was focused particularly on recording of animal

movements both within agricultural enterprises and within or outside the CR. In the autumn of 1998, the system was tested and from 1 January 1999, it will become fully operational.

A uniform system of cattle identification with eartags was established in the CR at the beginning of the 1960s. The numeric series for individual enterprises were allocated centrally. At present, the system of identification with one metal and one plastic tag with the same number is used. The tags and application devices are subsidised by the Ministry of Agriculture and they are provided to farmers free of charge. At their own expense, farmers can use another plastic tag for their own system of identification. This number is not centrally registered. The metal tag is placed into the left ear and the plastic one into the right ear. The Czech-Moravian Association of Breeders Ltd., as the organisation approved by the Ministry of Agriculture to operate the central register in harmony with the Direction of the EU Council No. 820/97, is responsible for the inspection of cattle identification correctness and proper record keeping on farms.

By law, the farmer is responsible for the correct keeping of animal registers by means of the prescribed form "Individual Register of Bovine Animal Keepers". All farmers receive detailed information on how to keep the register including all types of inspection.



Development of milk recording services in Estonia

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As a result of the continuous improvements in ARC information services, farmers have had good tools for dairy herd improvement. The farm management services, as well as breeding and reproduction information, are vital for farmers, whose objective is high efficiency and quality with low cost. Besides, there is a good chance of improving the efficiency of the national breeding programmes. The Estonian experience shows that farmers are ready and willing to pay the major cost of the service, which is useful in one way or another. Estonia has been a member of ICAR/INTERBULL since 1995 and looks forward to receiving the ICAR Special Stamp as soon as possible.

Dairy cattle breeding is a traditional area of animal husbandry in Estonia. Milk recording (MR) has 89 years of history and Estonian farmers have fairly good knowledge and experience of farm management. Therefore, dairy farming has quite a good chance for developing quickly in Estonia.

Animal Breeding Inspection is a State authority by the Ministry of Agriculture, responsible for the regulation and supervision of animal breeding in Estonia. There are three regional animal breeding inspectors for cattle. They take care of the execution of the Animal Breeding Law.

The first Animal Breeding Law since liberation has been categorical since May 1995. Since then the regulations for animal breeding as well as the law itself, have been constantly upgraded according to the new requirements (EU, ICAR).

The Government of Estonia supports animal breeding, especially milk recording and genetic improvement of the breeding programmes (e.g. estimation of breeding values).

The herd book, AI and other breeding services are the responsibility of the private breeding organisations.

The Animal Recording Centre is an economically independent department of the State Animal Breeding Inspection and occupies a central place in Estonian animal breeding providing services for dairy and pig farmers, breeding organisations as well as veterinary services, dairy processing industry, advisers and research institutions.

Summary

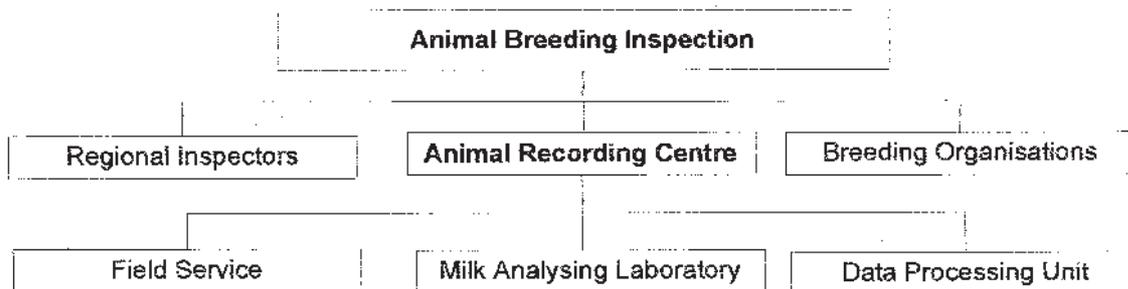
Introduction

Organisation of animal breeding in Estonia

Animal Breeding Inspection

Animal Recording Centre (ARC)

Figure 1. Organisation of animal breeding in Estonia.



ARC is fully responsible for the organisation and development of milk recording services, genetic evaluation of dairy cattle and data processing services for livestock farmers and breeding organisations in Estonia. In 1998 the Government subsidy was about 35% of the total budget. All the investments were covered by the State.

Farmers cover all the operational costs of the used services from ARC and the farmers fully employ milk recording assistants.

ARC has three departments:

The Field Service (FS)

The Field Service (FS) is responsible for the coordination of the work with the animal breeding inspectors, the control and training of the milk recording assistants and farmers, cattle identification, development of ARC services, advisory service and public relations (farmers, breeding organisations, etc.). For fifteen counties we have ten regional supervisors. They also operate as advisers for udder health, feeding and farm management.

About 20% of the advisory service is covered by the farmers, the rest is covered by a special State fund.

The Milk Analysing Laboratory

The Milk Analysing Laboratory is responsible for the milk analyses and the sample transportation. Most of the milk samples analysed are single cow samples from the farms in milk recording. Last year there was 1.06 million samples analysed for fat, protein, somatic cell count and urea. About 5% of the laboratory services were carried out for dairy factories: quality of bulk milk samples for payment. Since October 1994, there have been two lines of Combifoss 4300 installed in the laboratory. The analysing results are saved on the floppy disk and transmitted to the Data Processing

Unit (in the neighbouring building) for merging with barn information and further processing. The dairy factories receive their sample results via email and/or fax.

Since 1998, our laboratory has been participating in ICAR inter-laboratory tests. The national accreditation is completed and there is ongoing work to receive the international accreditation. The Ministry of Agriculture has chosen the ARC milk laboratory to be a neutral laboratory for milk analyses for payment. In August 1998, the Bactoscan 8 000 will be installed for the purpose of bacteria counting. As soon as the laboratory is equipped for all the necessary quantitative and qualitative analyses of milk quality, all the bulk milk for the payment will be analysed in the ARC central milk laboratory.

The milk samples collected for milk recording are also used for the disease monitoring and tested for virus diseases in the veterinary laboratory.

The Data Processing Unit (DPU) has two main tasks:

- development of computer systems and services for agriculture;
- data processing for milk recording and animal breeding for Estonia.

*The Data Processing
Unit (DPU)*

In 1993, it was decided to change the mainframe background with a client-server environment. The main reasons for this decision were too high costs of maintenance, development and exploitation of data processing and unsatisfactory service quality. The so-called "rightsizing" project was completed successfully in 1998.

A big effort was made to maintain and make use of all the old electronic data (production and pedigree information) collected during the past years and to improve the quality of the information services substantially.

The main objectives for the data processing services have changed: the quick information, possibly real time information, for the farmer, breeding organisation or adviser is possible to reach with the modern data processing technology. The duplicated data collection (AI, Central Cattle Register), etc., is to be avoided and new technology makes it possible.

The milk recording, herd book and artificial insemination are fully integrated into the same database and the output is made available for all the relevant parties. Since 1998, the Ministry of Agriculture, Animal Breeding Inspection, farmers and breeding organisations have had the possibility of ONLINE access to the database.

There are plans to develop and integrate all the farm-related registers to one agricultural information system in the future.

Milk recording

The total number of cattle was 325 600 and the total number of cows 162 300 in 1997. About 72% of cows are under milk control in Estonia. The number of cows in milk recording is diminishing in accordance with the continuously reducing cow population. The productivity of Estonian dairy cows is increasing fast (Table 2). The best milk performance years were 1988 and 1989, the worst year was 1993. The level reached was exceeded again only in 1997 (Table 2).

The number of cows subjected to milk recording has decreased 2.2 times. In 1993, 74.2%, in 1996, 68.5% and in 1997, 71.8% of cows were under milk recording. The average herd size was 48.1 in 1993 and 44.5 in 1997. Thanks to a new national cow subsidy for 1998 (102 DM per average milk recording cow), the interest in milk recording is growing.

The main method (99%) used for MR is B4. About 1% of the farms used A4 type of milk recording in Estonia.

The farms slowly start to use milk meters, approved by ICAR: Tru-Test HI and Milkoscope II.

Farm structure

There were about 40 000 holdings registered on the Estonian cattle register. On 1 August 1998, there were about 530 agricultural enterprises and about 2 400 private farms involved in milk recording (Tables 3 and 4).

From 1 January 1999, a new Farm Hygiene Law will be introduced in Estonia. In the scope of the new law, the farmers who have no milk-cooling equipment, will not be allowed to sell the milk. Most of these farmers have a herd of less than ten cows. It is doubtful that the number of small herds will drop.

Cattle identification

Until April 1994, the old within-herd identification system was the official system used in Estonia. In 1994, it was decided to adopt the system of a lifetime number in the scope of the EU regulations. The new regulation of cattle identification is valid for cattle born after August 1995. According to the regulation, all the calves are to be identified with a unique eartag (with a ten-figure lifetime register number) within six weeks after birth. In the milk recording herds the

Table 1. Estonian dairy breeds under milk recording, 1997.

Breed	Avg. no. of cows	Milk, kg	Fat, %	Protein %
Estonian Holstein	74 186	46 65	4.16	3.11
Estonian Red	40 118	3 904	4.30	3.22
Estonian Native	535	3 530	4.61	3.31
Total	114 838	4 394	4.21	3.15

Table 2. Dynamics of milk recording average milk performance in Estonia.

Year	Avg. No. of cows	Milk, kg	Fat, kg	Fat, %	Protein kg	Protein %	F + P, kg
1989	258 956	4 276	170	3.98	148	3.31	318
1993	181 139	3 428	137	4.00	107	3.11	244
1996	119 076	3 913	164	4.21	125	3.20	289
1997	114 838	4 394	184	4.21	138	3.15	322

Table 3. Herd size and farm structure, milk recording 1992-1998.

Cows/in herd	July 1998		1997		1995		1993		1992	
	No. of herds	%								
1 - 10	1 856	63.2	1 685	64.5	2 128	72.9	2 815	74.6		
11 - 50	636	21.6	484	18.5	291	10.0	291	7.7		
51 - 100	123	4.2	116	4.4	127	4.3	161	4.3		
<100	2 615	89.0	2 285	87.4	2 546	87.2	3 267	86.6	46	10.7
101 - 300	235	8.0	240	9.2	278	9.5	342	9.1	99	23.1
301 - 600	68	2.3	67	2.6	74	2.5	120	3.2	158	36.9
601 - 900	12	0.4	13	0.5	14	0.5	27	0.7	83	19.3
901 - 1200	5	0.2	4	0.2	5	0.2	6	0.2	27	6.3
1201 -	3	0.1	3	0.1	3	0.1	5	0.2	16	3.7

Table 4. Number of cows, number of herds and size of herds subjected to milk recording, August 1998.

Cows/in herd	No. of cows	%	No. of herds	%
1 - 10	9 368	7.8	1 856	63.2
11 - 50	12 107	10.1	636	21.6
51 - 100	9 165	7.6	123	4.2
<100	30 640	25.5	2 615	89.0
101 - 300	41 563	34.6	235	8.0
301 - 600	28 035	23.4	68	2.3
601 - 900	8 577	7.2	12	0.4
901 - 1200	5 224	4.4	5	0.2
1201 -	5 909	4.9	3	0.1
Total	119 948	100%	2 938	100%

animals are identified and registered by the milk recording assistant or/and farmer, whereas the rest of the herds (about 30% of the cattle), by the veterinarian.

In the central cattle register there are 275 008 animals registered (01.08.98), which is about 79% of the total number of cattle in Estonia. In milk recording herds, there are 120 119 cows and 100 282 of young cattle stock under control. From these, 51.6% and 73.3% are registered in the central cattle register.

Genetic evaluation

From May 1996 the Multiple-trait BLUP Animal Model has been used for genetic evaluation of milk production traits and Estimated Breeding Values (EBVs) for dairy type.

EBVs for milk production traits are estimated for 100 days and 101-305 of first lactation, second and third lactation. Estonian cattle breeders are effectively using the EBVs for cows for breeding for higher quality breeding replacement.

The Relative Breeding Values (RBV) for production index were expressed with a mean of 100 and standard deviation of twelve points, combining breeding values of milk, fat and protein quantity by relative economic weights of -0.1:1:6 for Estonian Red cattle and 1:1:4 for Estonian Holstein cattle. The national evaluation is published twice a year for both breeds.

In 1998, the first official INTERBULL proofs for Estonian Holstein bulls were obtained, which give fair ground for the decisions made for import and also for the national breeding programme.

From 1997 onwards, preparatory work has been taking place in order to implement a multi-lactation Test Day Model for genetic evaluation for Somatic Cell Count. The EBV for SCC was prepared with the help of colleagues from VIT, Verden. Work was also done on reproduction and fertility traits.

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Data processing and computer developments of milk recording in Estonia

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Summary

1. The transmission from the mainframe data processing system to the use of Relational Database Management System (RDBMS) is a complicated task:
 - * it is a long-term process during which the data have to be synchronised;
 - * the quality of the data used in the mainframe system was deficient for the implementation of the RDBMS. For the data transmission, we had to improve the quality of the data saved in the old system;
 - * the designers, programmers and users of the system need some time to adapt to the ideology of RDBMS.

2. Soft- and hardware experience:
 - * there should be widespread use of the RDBMS version. It gives us the tools for the development, flexibility and support for the future;
 - * at the time of development of the system, a powerful hardware and expensive operation system were not needed. For example in the case of Oracle the changing of the database server and the operational system was not a problem. Besides, the development of soft- and hardware is fast;
 - * in the case of a relatively small population of animals, the system can successfully be exploited at the cheap INTEL/Windows NT platform.

3. Development experience:
 - * the advice of the foreign experts was important to us;
 - * people need extensive training;
 - * the data model has to be planned in the early stage of the development of the system;

- * for the unique identification of animals (objects) in the database, it is very useful to apply the identifications generated by the system (in the case of Oracle by Sequence). The identifications of animals used by people, register numbers, inventory numbers, names, etc., are not suitable as a primary key;
- * as few calculated values as possible should be saved into the database. For instance the calculation of the current lactation production and the control-year production “in-the-fly” is justified;
- * it is practical to save the pedigree of animals recursively into the database, the data of the animal sire and dam is not saved in the animal’s own record. Only the pointers to sire and dam records from the same table are saved in the records.

Introduction

The Animal Recording Centre (ARC), a service organisation for milk recording, occupies a central place in Estonian animal breeding providing services for dairy and pig farmers, breeding organisations as well as veterinary services, dairy processing industry, advisers and research institutions.

This report gives the historical overview of the development of data processing for the milk recording (MR) and cattle breeding in Estonia. Above all, we would like to share our efforts and experience with the so-called “rightsizing” project (1994-1998): the transmission of the data from the mainframe data processing system to the PC system of RDBMS on Intel/Win NT. The whole technology was completely changed and all the operations reprogrammed.

There were two main reasons to accept the challenge:

- the service was not satisfactory for the farmers and breeding organisations therefore there was danger that they would not be motivated to use (and pay) for the service;
- the mainframe system was morally and physically old and maintenance and development of the system would be too costly.

Getting started with computers

The introduction of computers and electronic data processing of Estonian MR can be divided into four stages:

1. The first attempts at the computerised data processing in Estonian milk recording were made in 1964. At this time the computer only calculated the herd yearly productivity average. The estimation of the breeding value for the bulls (contemporary comparison) was also started.
2. During the second period, the elaboration and implementation of computerised data processing of milk recording got under way: regular monthly reporting, herd year summaries, etc. In 1969 the application

Table 1. Abstract of process of development.

1964	Herd yearly productivity averages. Sire evaluation: contemporary comparison.
1969	Start of computerised data processing of milk recording.
Up to 1982	Data processing in different units on computers of two generations.
1978	Start of designing new data processing system for the IBM/370 compatible computer.
1982	Estonian Research Institute of Animal Husbandry received a computer EC-1035 (1MB RAM, 3x29MB disk units, SVS).
1982-1984	Transition period to the new mainframe system. Since 1984 there has been centralised data processing in Tartu.
1986	Replacement of the computer and the operating system: EC-1055M with 4MB, 8x100MB disk units, CBM 3.0 (VM/SP) Trial of ADABAS. It was clear that the capacity of the computer was not sufficient for using the database system.
1986-1992	Quiet development.
1993	The Animal Recording Centre was formed. We made a decision to replace the mainframe background by the PC background for the future. We chose Oracle 7 under NetWare 3.12 for development.
1994	Start of putting local network and Oracle into use. Milk Analysing Laboratory got two lines of Combifoss 4300 and the so-called <i>Laboratory</i> programme was put into use on PCs. It was an essential improvement of the milk recording service. Data Processing Unit replaced the mainframe EC-1055M with mainframe HDS-8053.
1995	Enjoyment of the increased capacity of the mainframe and continued development of services on the mainframe. The rough draft of data model and technology was designed for the ORACLE System.
1996-1997	Stopping of the development for the mainframe system, however, mainframe was operational for all the services. Programming in Oracle. The first run of BLUP Animal Model, the first operation, application and output, utilising new cattle database in ORACLE. Synchronisation of data between the mainframe and the Oracle database every night. Replacement of the ORACLE database server and new operating system.
January, 1998	Start of production of MR services in Oracle. The so-called <i>Laboratory</i> programme is running in Oracle. That means that the data input of milking tests, AI, events and output: four different reports (milk recording reports, pre-print of barn lists, udder health report and invoice) is executed in Oracle.
May, 1998	Printing modified pre-printed barn lists for small size herds.
June, 1998	Full cycle of data processing (input, check and maintenance, output reports) for small herds in Oracle. Milk recording reports, error-list and as option action-list added. The batch technology of data processing was put into use. The whole technology will be applied to all the herds in September 1998.

programme was launched in one of the counties, by 1973 the system included as many as 105 000 cows which made up 43% of the total number of cows in collective farms. The work was disbursed amongst several computing centres. The use of computers of different type and different applications called for the adaptation of programmes.

3. In 1984, centralised data processing began. All the production, reproduction and breeding data were organised in one data bank in Tartu.
4. The application of the RDBMS Oracle was started in 1998.

A Survey of the So-called “Rightsizing” Project - Our experience

Something had to be changed – 1992 to 1993

The re-establishment of Estonian independence in 1991 brought about major changes in society as well as in agriculture. The creation of private farms was explosive: in 1992 there were 429 herds using the MR services of the ARC, whereas by the end of 1993 the number had gone up to 3767. The tendency was accompanied by a rapid decrease in the average herd size caused by the agricultural reform in Estonia. The data processing system of milk recording, designed at the beginning of the 1980s for a small number of large-scale farms and often with a view to meeting the requirements set by the Soviet Government in Moscow, was well out of date. The lack of computer capacity determined the primitive nature of the data processing technology. The service was no longer acceptable to the client. The State obviously could not provide 100% funding for the MR service any longer.

Taking the decision - 1993

It was decided to change the mainframe background, as its development and exploitation costs were too high. By that time some of us had seen the first PCs and had had some experience with the database (FoxPro). Within a very short time, it was decided in favour of a server of RDBMS architecture: a short list between RDBMS Progress, Gupta and Oracle was made. We discussed the choice of the operating system which in retrospect, did not make much sense.

We opted for Oracle 7 for NetWare 3.12 and Oracle Tools for DOS as the development tools. As for the database server as well as the local network server, Olivetti Suprema M6-880 with 60 MHz Pentium processor, 64MB, 3GB were bought. Thus, in the beginning we had to make a start with modest means.

It was in March 1994, when the local network and Oracle were installed and most of the programmers got their very first working experience with PCs. We were amazed by the obsolescence of the Oracle Tools for DOS. We were not able to put it into actual use, but at the same time the service was in need of improvement.

The first acquaintance with Oracle and its developer tools - 1994

In October 1994 we laid a foundation for the further improvement of the service by fitting the Milk Analysing Laboratory with two Combifoss 4300. These devices allowed the real electronic recording of the milk analyses results. In cooperation with the Verden Computer Centre in Germany and in particular, with Dr Jürgen Claus, we had completed a FoxPro application for the merge of the milk analyses and barn lists results and for printing the test-day reports for the clients. In the same year, the lifetime numbers for the cattle were introduced, since there were two different types of ID numbers (intraherd and/or lifetime) in use. The collection and input of AI data, as well as type classification data, was reorganised.

The improvement of the service quality - 1994-1995

At the same time, the small capacity mainframe EC-1055 of the DPU was replaced by a real mainframe HDS-8053 which allowed the large-scale implementation of the database system Adabas and granted a good contact between the PCs and the mainframe.

The Oracle development environment Oracle Developer/2000 was launched and it was found that it was possible to programme in Oracle. The visit of Dr Eildert Groeneveld (from Germany) to Tartu in November 1995 was of great relevance and the results were stated in the article "Konzept zur Organisation der Datenbank und Datenverarbeitung am Jõudluskontrolli Keskus in Tartu". The implemented ideas about the automatic batch processing are derived from the very same paper. As for the method of production calculation, we opted for the interpolation method, suggested by ICAR and as the processing period we chose the interval between one test milking (day excluded) and the next one (day included). Intraherd and interherd comparison is based on a calendar month.

The elaboration of the data model and the conception of data processing for the cattle database in Oracle-1995

After the establishment and testing of the data model structure, the "rightsizing" project advanced at full speed. There were four DPU programmers engaged in the programming. The completion of the project took approximately 1000 man-days.

Programming. The data synchronisation between the mainframe and the PCs - 1996 to 1997

At the same time the saving of the current and historical data of the mainframe was started in Oracle. The synchronisation of the data between the mainframe and the Oracle database was now our every-day work. The loading of the data model and the synchronisation of the data, form one of the most complicated parts of the project. It was mainly due to the

deficient quality of the data saved in the mainframe. A lot of the data quality checks were done during the preparation for the implementation of Animal Model (1996) for the estimation of the breeding values and joining INTERBULL (1997) services later on.

Status quo - July 1998

Hardware and software of the “rightsizing” project

Database server, DELL POWEREDGE 6100, installed in July 1997 with:

- 2 PentiumPro 200MHZ, 512KB Cache processors
- 256 MB ECC EDO RAM
- 6 x 4 GB SCSI-2 Ultra/Wide 7200 rpm HDD
- DLT 15/30 GB backup unit
- Windows NT operating system
- Oracle Server Enterprise Edition 8.03 for Windows NT.

Local network server, DIGITAL Prioris MX 6266, installed in January 1998 with:

- Pentium II 266MHZ processor
- 128 MB RAM
- 3 x 4GB HDD
- Novell NetWare 4.11 operating system for 50 user licenses and Connect 2.0 of NetWare with 8 licenses.

Network printer, 24-ppm HP LaserJet 5SI/MX with duplex unit, multi-bin mailbox and 2000-sheet input tray.

Developer tools

- Oracle Developer/2000 Release 1.5.1
- Microsoft FrontPage98
- Micrografx FlowCharter7.

Data processing services

Altogether there are 3033 herds with 123 000 cows (which make up 73% of the total number of Estonian cows) in milk recording. Since January 1998, the entry of data and the processing of test milking have been executed wholly in Oracle, i.e. all the farmers get the following reports:

- * milk recording reports (test-day results of individual cows and herd and/or milking group average: milk, fat, protein, urea, SCC);
- * pre-print of barn lists for test milking;
- * udder health reports (extra service);
- * invoices.

Printed Estimated Breeding Value (EBV) reports for cows and young-stock and cow sheets (pedigree + production + reproduction) are provided as extra services. New services for the farmers: reproduction advice, feeding advice, accordance with milk urea content, sire mating advice, etc., are designed.

The farmers and the breeding organisations have access to the EBVs for type, production and SCC. There are several options for all the clients, especially while the small holders' needs differ from those in large scale farms.

In addition we offer the on-line service. If the client is in possession of a PC and a modem, they have access to their data in the central database. They can make inquiries and download the data for local use.

The current calculation of milk production and monthly report printing is at present executed in two environments, namely:

- * small size herds (up to 30 cows), i.e. 2500 herds with 21 000 cows i.e. 82% of the total number of herds and 17% of the total number of cows have been processed wholly in Oracle since 1 June. Besides the above-mentioned reports these clients receive the main report of the MR period and in the case of errors, an error report. The results are processed on the day of laboratory tests or the day after and the reports are posted via regular mail;
- * in the case of large size herds, the milk recording data processing and the main print of production period (530 herds), are executed by old technology (up to September 1998) on the mainframe and the clients get the reports twice per the production period (month).

Table 2. Main cattle tables in Oracle system and data contents.

Table name	Content	Number of entries
Owner	Our clients (MR+AI+IR)	40 622
Animal	Animal pedigree	1 430 000
Owners' animal	Location of animals	606 000
Milking	Milk recordings	3 560 000
Lact	Lactations	3 200 000
Insemination		740 000

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Milk recording in the service of herd improvement, quality milk production and herd management in Hungary

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Dairy herd recording has 88 years of tradition in Hungary.

In harmony with the supervisor and control organisations of the Hungarian cattle breeders and according to the Breeding Law enacted, the country-wide company network with seventeen Regional Centres of Livestock Performance Testing Ltd., has initial data for almost 860 dairy herds with 270 000 cows and their offsprings (66% of the dairy cattle population) to record of herds, and are equipped to provide regular and instant information on cow status and yields by monthly contact for herds as the company's own service.

Another one of our services is to provide regular monthly information via the National Database according to the regulation in the Codex of Cattle Performance Tests.

The regular services for assisting selection are described in bi-lateral information service contracts between the Company and the owners of recorded herds.

There is an additional contract with conditions of surplus information service assisting quality milk production by regular Somatic Cell Count tests. This service has already been required by 95% of registered herds and this rate is still increasing.

More and more herds intend to use our recently introduced "Udder Care" service with extended use of SCC test results and advisory programme. The development of an extension project for urea test and a feed monitoring programme was also introduced in 250 herds.

New information services have recently been introduced, namely: an information service for assisting reproduction biology and AI activity in recorded herds and two versions of an "Economic Breeding" System: One is for herds not having on-farm PCs and a more advanced version developed for herds having their own PC.

1. Information services

1.1 Services via the company network of Livestock Performance Testing Ltd.

1.1.1 Data collection and tests of data

1.1.2 Herd Recording Information Service

The monthly managed data collection and data tests (in-built error-check), need no paper.

The forms and contents of former "input-sheets" now used in the PCs of regional centres and fist computers (hand-held data captors) of herd recording staff are identical to the standards used in the database.

The schedule of recording data of herds with planned error correction and data transfer to the central computer of the database, provides predictably fast output return to the herds.

After the monthly test day is completed during the preparation of data supply for the database, the fast information service is ready for the herds, according to the equipment of herds available:

A) Right after the test day ends:

- the barn-book can be completed with the cow survey, their status and milk yields, if there is a printer or an on-herd computer available;
- the instant transfer of milk yield data from data-captor to the on-herd computer may take place.

B) After milk samples are tested in the central laboratory for fat, protein, somatic cell and urea content, the test data are transferred back overnight on the PC > FAX-MODEM > PC of the Regional Centre and the following services are completed (2-7 days after the test-day) by the regional centres and sent to the herds:

- the barn-book is completed with data of milk components;
- the individual cow survey is completed with somatic cell count data and tables for drafting cows according to milk quality classes.

The following services are on floppy disk for contracted partners when requested:

- individual cow sample test for *urea*;
- a unique service for those partners who have compatible modem contact to get complete information service back as fast as 2-4 days after test-day.

The “SAMPLE TEST EQUIPMENT > CENTRAL PC > FAX-MODEM > PC of REGIONAL CENTRES” System of Livestock Performance Testing Ltd., was installed two years ago. Since then this system has made its own information service more effective and faster.

- 3.1 Monthly reports based on S.C.C. tests.
- 3.2 Feeding monitor information monthly reports based on urea tests.
- 3.3 Reproduction biology reports.
- 3.4 Information service and extended service for dairy herds udder care programme.
- 3.5 “Breeding Economy” projects.

*1.1.3 Herd
Management and
Extension
Information Service*

The official dairy herd recording has a large database, information about the “history” of individual cow performance and lactations in progress can only come from the archive database. The data flow from the regional centres of Livestock Performance Testing Ltd. is obviously aimed at the central database and the following information service is sourced in the database.

**1.2 Services via
the central
database**

1. Monthly services:
 - monthly herd report;
 - list of cows with completed lactations;
 - individual cow charts with ancestors, yields and offsprings.

The monthly services processed in the database reach the herds 15-25 days after the test days or rather 10-15 days after the data sent for processing.

2. Periodical services:
 - yearly herd surveys of the cows with completed standard lactation;
 - yearly surveys of all the cows with various status.

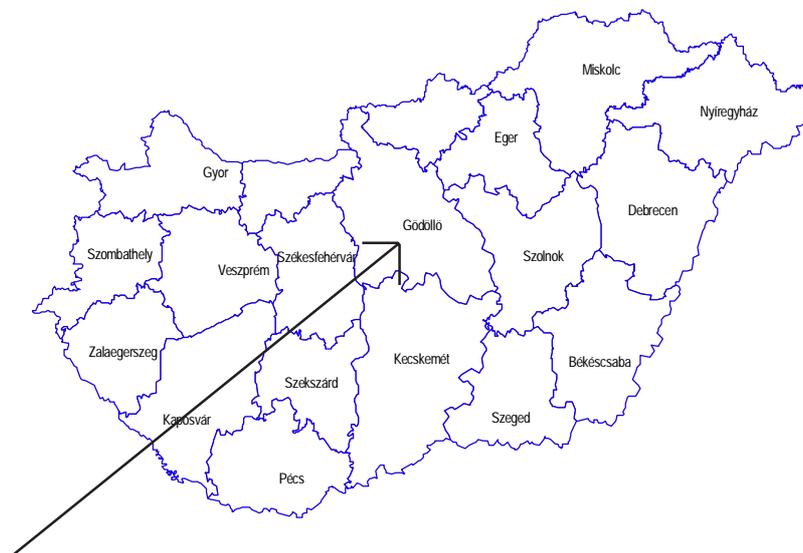
The services provided by regular milk recording are developed mainly for genetic improvement, but increasingly herds as contracted partners of the Livestock Performance Testing Ltd., join in the quality milk production oriented programme and benefit from regular somatic cell count tests and other management information (e.g. urea test and monitoring of herd feeding regimes; reproductive status of herds and cows; advisory information for herds to manage breeding and milk production economically). There is on-going development in the milk-sample-test central laboratory to measure keton-body which will help the extension of information services and advisory activity.

The activities and services have been introduced to show the status and situation achieved mainly in large herds controlled by method “A”.

In order to extend milk recording to the herds of small-holders by the first quarter of this year, we began to introduce method “B” in most of the nineteen counties of Hungary.

The potential benefits of this activity in the long-term, will be the improved and regular information service for about 55 000 breeders and the active population can be enlarged by about 130 000 milk-recorded cows.

Figure 1. Regional Centres of our company.



Gödöllő, July 1998.

Figure 2. Dairy herd recording in the structure of the Hungarian cattle breeding organisation.

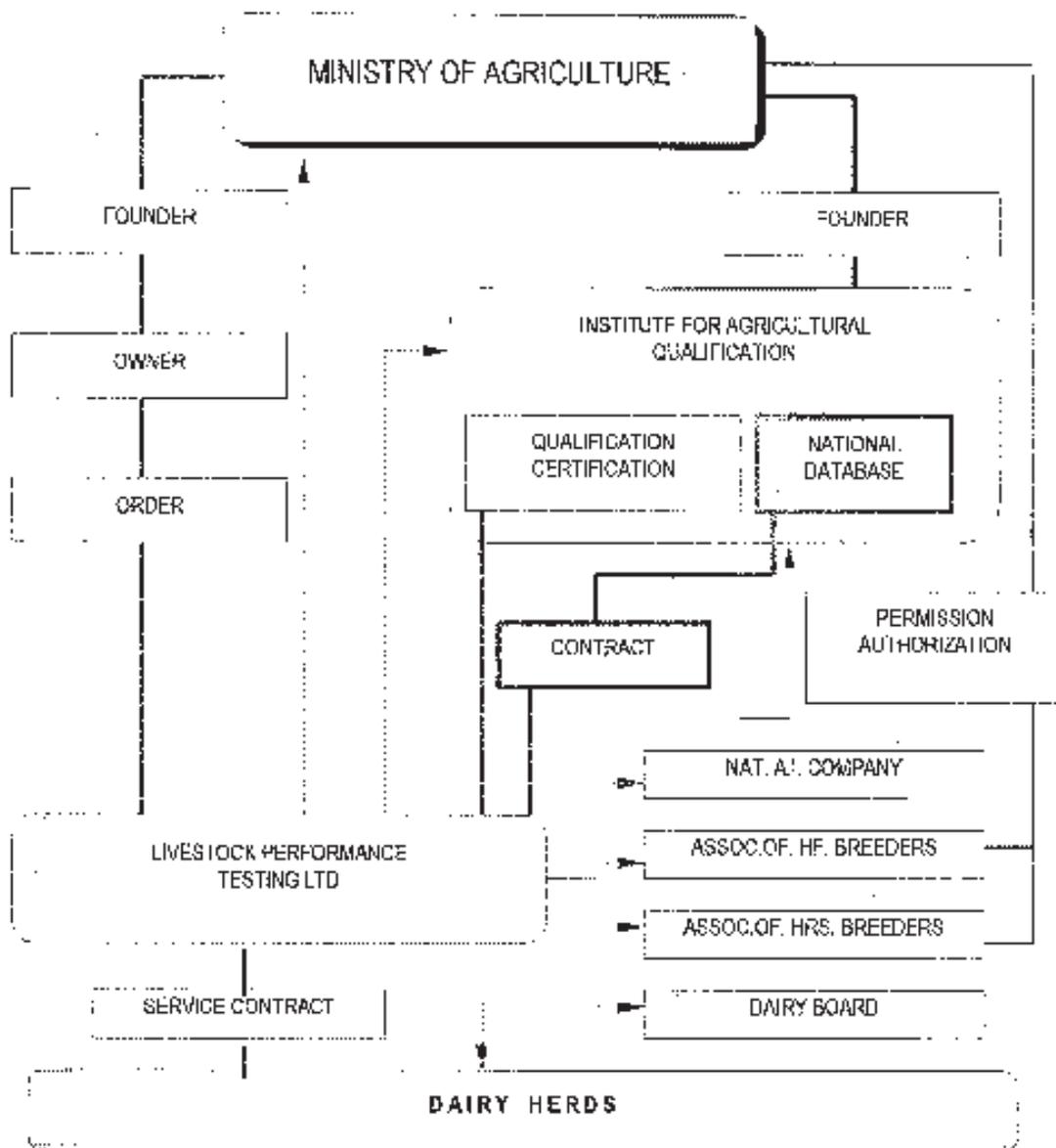


Figure 3. Service activities of AT KFT (Livestock Performance Testing Ltd.) in the data and information flow provided for the recorded dairy herds.

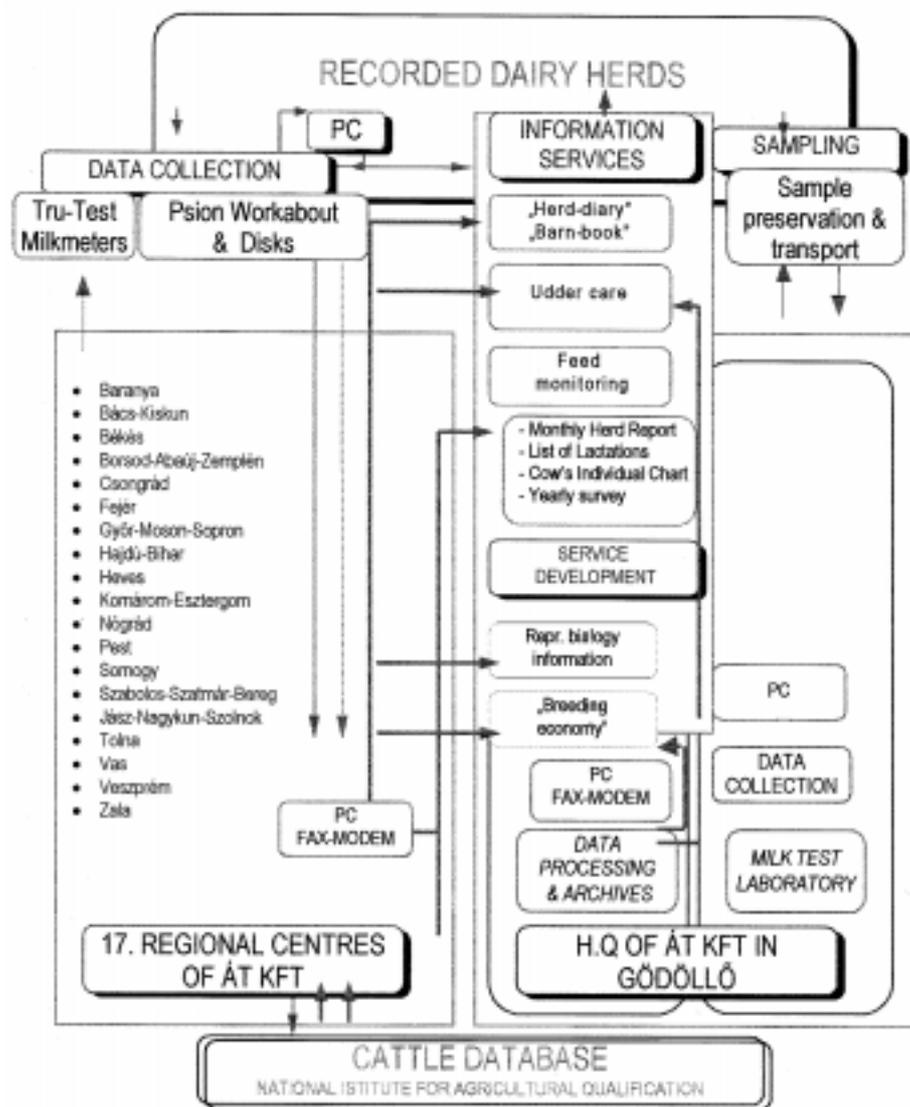
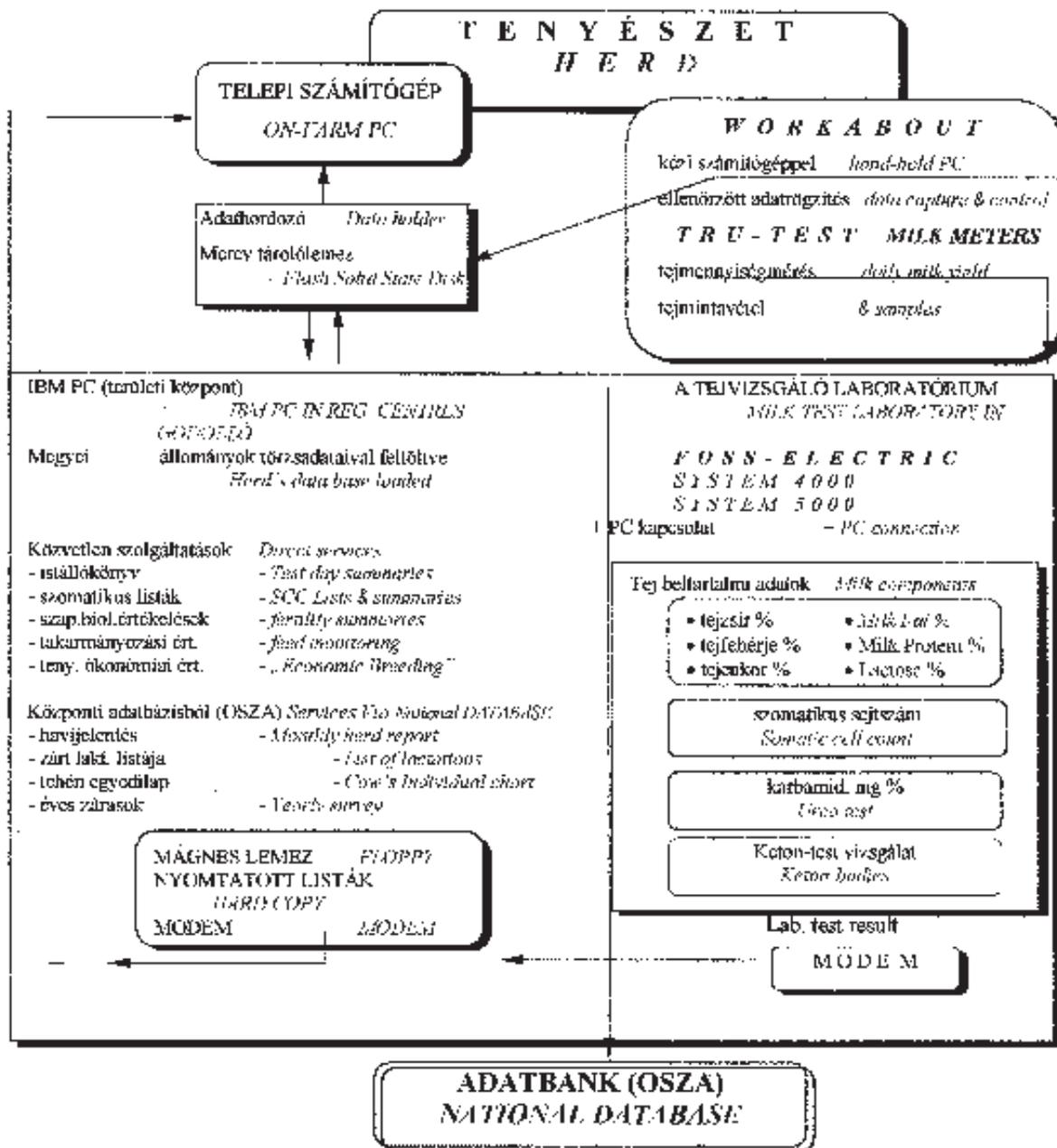


Figure 4. Flow-chart of data capture and process in dairy herd recording.





Brief review of animal recording in Latvia

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Latvian animal recording started in 1904 when the first animal recording association was established. It expanded during 1910 to 1914 and eventually in 1914 there were 366 animal recording associations. On average, about twenty farms (approximately 230 cows) formed each association. Each association employed one milk recording assistant who visited every farm once a month and regularly registered yield, remaining feed, formulated feed ratios, trained milkers on how to milk cows, treat animals and what breeding stock to buy. Due to the not very efficient work of milk recording assistants, it was very expensive for farmers to afford. Only the richer ones could afford it.

Before World War II, 26% of cows were undergoing animal recording. During the Soviet Union period, the State completely financed recording and therefore by 1960, 55% of cows were being milk recorded and by 1969, this figure reached 87%. This continued until 1992 by which time State-owned cows were recorded and about 7% of privately owned cows.

When privatisation started, farmers had to pay for recording. The proportion of cows recorded rapidly diminished. Farm sizes went down to two to ten cows per herd and farms were disseminated geographically. This all meant that the previous system was destroyed and had to be re-established. Thankfully, due to State support, animal recording was kept alive.

If only 22% of all cows were recorded in 1993, then this figure rose to 37% in 1996.

During 1997, major restructuring reforms in the Ministry of Agriculture took place. As a result of State Ltd. "Latvian State Data Processing and Breeding Information Centre", the main tasks were the following:

1. Establishment and maintenance of animal and herd recording.
2. Summary and analysis of breeding animal information.

Presently 33% of Latvian cows are under milk recording, 30% run in “A” system and 70% in “B” system. Nine hundred milk recording assistants are registered in Latvia, 700 of which are on a part-time basis. Two independent milk laboratories were established in 1998, however, twelve laboratories in milk processing plants still continued to be used. New regulations for animal recording came into force in 1998. These regulations were elaborated according to ICAR.

The following are the budgetary plans for the next year (dotted lines in the flow chart attached are for the institutions to be implemented provided that State financial support is allocated):

1. To establish animal breeding inspection.
2. To decrease the amount of milk recording assistants and to equip the remaining with modern equipment (scales, milkoscopes, etc.).
3. To modernise local data processing centres and connect them to Internet.
4. To develop new animal recording software.

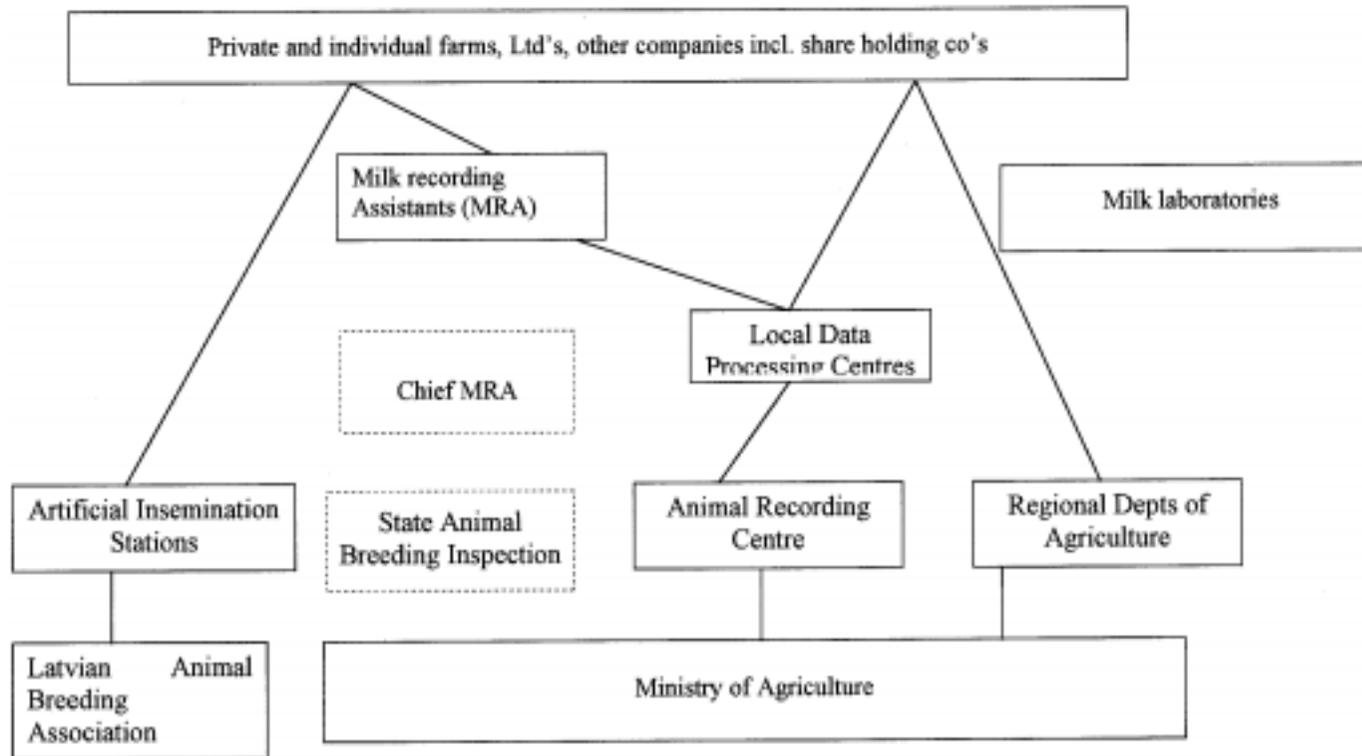


Figure 1. Latvian structures for animal recording.



Activities and management of milk recording and identification in Lithuania

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Lithuania, which has deeply rooted traditions of animal breeding and places great emphasis on its development, has thereby considerable potential for the development of the dairy sector. The efforts of animal breeders and growers have played a big role in the dairy sector development but the sector was also influenced a lot by the historical, climatic and economical conditions and other circumstances.

Milk recording

When Lithuania restored its independent statehood and started sweeping economical reforms which brought about radical changes in the farming sector and land ownership relations, animal stock decreased for some time.

Lithuanian farmers always found it necessary to keep productive animals. They were eager to rear good, young stock for renovating or expanding their herds or to sell. We are satisfied with the substantial increase in cow productivity in recent years, considerable improvement in the structure of our cow herds and by assiduous and efficient work of many of the private farmers and agriculture companies.

In order to bring about desired changes, it will be necessary to:

- improve the quality of animals by performing breeding work with pure-breed stock and by using imported genetic potential;
- bring the number of cows under control up to 70-80%;
- improve animal identification methods;
- unit animal growers into associations and cooperatives;
- continue improving the management of animal breeding;
- set priorities in the animal breeding sector.

The dairy herd improvement is impossible without systematic animal recording and milk recording. In 1923, milk-recording was started in Lithuania. A large scale organised cattle breeding system and cattle breeding service were developed in 1958. The system allowed the introduction of milk-recording on a higher scale. The publication of annual reports on milk-recording was renewed in 1959. Since then annual reports are issued and published every year. The development of computer

programmes for the needs of milk-recording database management was started in 1967, when the Lithuanian Institute of Agriculture Economics acquired a large computer, Minsk 22.

The first version of a cattle breeding information system (GVIS) was introduced in 1969. The system was developed by the introduction of a numerous number of animal recording items and by adaptation of the system according to the changes of the cattle breeding management system. Since 1979, the system has been introduced to all milk-recorded dairy herds in Lithuania.

The sub-system for cows, including dairy herd reproduction data analysis, has been developed at the computer centre. In 1988, all cows on collective and State farms were under milk-recording (total 553 000 head).

The GVIS sub-system for pedigree bulls has been developed too. The sub-system was transferred to personal computers and introduced in all regional cattle breeding enterprises (A.I. stations). In 1993, the sub-system for cows was transferred to personal computers and all information was transferred from large computing machines into personal computers in 1994. Since then, we have started to calculate data with Oracle.

The number of milk-recorded cows in agricultural partnerships (agricultural companies) had decreased, but increased on private farms. There are currently (01.10.1997) 130 000 cows under milk recording, i.e. 22% of the total cow population. Sixty-eight thousand or 52% of all milk recorded cows belong to agricultural partnerships and 62 000 or 48% belong to private farmers. Of these 130 000 milk recorded cows, 85 000 (65%), represent Black and White Cattle and 45 000 (35%), Red Cattle.

The year 1996-1997 witnessed an increased milk yield of recorded cows. The average milk yields were 3 604 kg with 4.14% fat and 3.31% protein per cow per year. The milk yields were higher by 288 kg and fat by 0.02%, in comparison with the 1995-1996 milk recording year.

In 1993, reorganisation of the milk laboratories was started in order to improve the national animal breeding system by the establishment of one central accredited milk composition and quality analysis laboratory for cattle breeding purposes instead of the former four regional milk test laboratories at the animal breeding enterprises.

During the period 1993-1997, the State enterprise "Pieno tyrimai" (VÁPT) was equipped with modern laboratory facilities for milk testing as well as auto-refrigerators and containers for transportation of milk samples. The laboratory equipment gives the possibility to test fat, protein, lactose, dry matter, urea, lemon acid, bacterial pollution, added water, cell count and some diseases, very quickly and with high accuracy in one milk sample.

At present, VÁPT is supplied with the most modern equipment for identification of milk samples and milk analysis. Over three million milk analysis are done a year in the laboratory. The main part of the analysis results is used for cattle breeding tasks.

VÁPT is trying to get accreditation which will increase the recognition of the laboratory and results of milk analysis. Also it will present an opportunity to take part in the inter-laboratory check system.

VÁPT is responsible for milk recording on a national level. Milk recording on the individual private farms is carried out by control assistants according to agreements and milk recording in herds belonging to agricultural companies is carried out by cattle breeding advisers of the farms according to agreements with the milk recording service. The control assistants are managed by managers of milk recording services at regional level.

Lithuania's animal production was one of the most developed within the former Soviet Union and now has highest priority in the Government's agricultural policy, since the number of animals has been stabilised. As the self-sufficiency with animal products is very high (namely milk and meat), the development of the export trade is the only possibility to maintain the considerably high production potential. Furthermore, animal breeding is a traditional activity in Lithuania with a high demand potential for exporting breeding animals to the CIS countries. These two facts, together with the necessary control of animal infection diseases, are the main reasons for the implementation of an animal identification system according to EU standards.

There are three main reasons for animal identification in Lithuania: control of animal infection diseases; trade with animals and animal breeding. Currently there is also internal interest to identify the dairy cattle for supporting farmers.

Current animal identification activities in Lithuania have been developed in animal breeding, partially taking into consideration and meeting EU standards. The non-breeding is less developed.

Animal identification is mentioned in two documents: the order of the Ministry of Agriculture and Forestry "On Animal Identification" adopted in 1997 and the Law on Animal Breeding (No. 1-384) adopted in 1994. The Animal Breeding Law affects only breeding animals.

In regard to animal identification, Lithuanian animal production is split into two areas, namely breeding and non-breeding, which are developed in different ways. Whilst the breeding area has a relatively well developed recording and therefore, also identification and registration infrastructure, the non-breeding area, which includes mostly private animal owners, has

Animal identification in Lithuania

a very low degree of organisation. However, this situation is likely to improve as there are substantial structural changes expected, speeding up the organisational activities in all animal production.

The current identification system, already taking into consideration the EU requirements, has been developed for cattle breeding purposes, including 130 000 cows under milk recording, out of the total number of over one million cattle. This system partially meets EU requirements and includes a numbering system with a unique number for each animal and a central, computerised database.

The implementation of the current system in the cattle breeding area started in 1995 and took into consideration basic requirements of EU standards, namely the directive 92/102 EEC. The main requirement of unique numbering of each animal is met.

The animals in Lithuania have three kinds of identity: eartags, ear tattoos and ear cuttings.

More than 50% of eartags used for breeding cattle identification are of domestic origin. The requirement of non-reusability of eartags was solved until recently in a sub-optimal way. Also the design of surface contacting the ear skin was not fully satisfying. The rest of the eartag market is shared by two other companies who provide tags produced abroad.

The tags contain the following information: LT followed by eight characters; the first two are the code of the region, the next two are a serial number and the last four are the individual number of the animal. The characters are branded and the use of any written characters is not allowed. The lost tags are replaced by tags with the same number, provided by the producer on request of the responsible institution. Imported animals are identified additionally by Lithuanian tags. The tags are ordered by the regional officers of the animal recording service. To date, 86% of the recorded breeding cattle carry the above mentioned tags.

There is a register of animals on large holdings, i.e. former cooperatives and so called agricultural partnerships. In fact, all the partnerships are involved in animal breeding. A considerable number of private farms are also included in the breeding system. They share a comparably low number of animals, which, however, steadily increases.

There are no registers on private farms.

There is no registration system of farms for the purpose of animal identification and a registration system in general.

There is no registration of animal movements. Animals to be slaughtered (for meat production) are not identified and registered.

There are two documents in Lithuania requiring animal identification, they are the order of the Ministry of Agriculture and Forestry “On Animal Identification” adopted in 1997, and the Law on Animal Breeding (No. 1-384) adopted in 1994. Both documents require identification numbers for animals in the territory of Lithuania. However, there is only partial compatibility with the EU Directive 92/102/EEC. The Animal Breeding Law affects only breeding animals.

The Law on Veterinary Activities from 17 December 1991, does not require animal identification at all to meet the tasks mentioned.

Breeding pigs are identified by cut ears, ear tattoos and foreign produced tags, most of them provided by a private company, which also shares the largest part of artificial insemination in Lithuania.



Milk testing system organisation in Lithuania

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In the opinion of the PHARE project, which was executed during 1992-1997, it is sufficient to have one central raw milk research laboratory in such a small country as Lithuania, where high cost analytical equipment and professional specialists are concentrated, to make milk analysis services for various departments act as an arbiter in argumentation of various milk research questions. When an independent laboratory started the research of milk payments, their first step was in the conflict solution between the milk producer and dairy plants. The existence of a central milk research laboratory, allows a milk sample quality system, to control/calibrate the accuracy of milk counters in the laboratories of milk plants and to supply other qualified services. There are less labour costs when using a central milk research system, more accurate results are achieved, it is easier to correct mistakes and the control process is improved.

In 1993, the reorganisation of the Lithuanian National Livestock System was started in reorganisation of all existing laboratories and four laboratories were declined. Accomplishing a dairy research system reorganisation, improving livestock, the decision to establish one central dairy research system and to change old testing equipment to new ones, was made. For this purpose, all new equipment was concentrated in one authorised organisation, the State Milk Research Laboratory "Pieno Tyrimai". To avoid strategic mistakes in the farming branch, having such short terms of reorganisation, the Lithuanian Ministry of Agriculture decided to use the recommendations of another PHARE programme project, "Improvement of Cattle Livestock". The authorised milk research laboratory "Pieno Tyrimai", since 1995 has considerably improved its work. During 1996, the State Milk Research Laboratory "Pieno Tyrimai", conceived and developed a milk sample delivery and information data flow distribution system. All working places were fully computerised; the internal laboratory control system was developed and introduced. Many important problems, related to routine milk sample checking in the laboratory, were solved practically and effectively. Unfortunately,

during 1995-1996, all problems were not completely solved and the Lithuanian Ministry of Agriculture extended the terms of the PHARE project, "Extension of Human Resources and Improvement of Cattle Livestock". During 1997, the Ministry of Agriculture additionally assigned financial support from the Government budget to obtain new equipment and instruments and to settle the quality system of the authorised Dairy Research Laboratory. The experts of the PHARE project, Dr Peter Doubravsky and Mr L. Doering, paid a lot of attention and made great efforts for the laboratory foundation and cattle productivity control, but also on payments for milk.

The Ex-Soviet rural economy has divided the milk producers and milk plants into two separate camps, a lot of milk producing and processing problems were not solved until recently. Relations are strained, as the cooperation movement in Lithuania has not started yet. Even now, the existing dairy associations unite the milk producers and milk processing plants separately. Hygienic and quality problems are used in order to satisfy the interests of one or the other side and in the presence of incomplete legislation, controversy occurs frequently.

The milk quality and composition research and payments for milk were settled by the milk processing plants and the milk buyer organisations. The milk producers (farmers) were not satisfied with the control results they were receiving from the milk processing plants and are not convinced that the results are reliable. From the other side, milk plants were not satisfied with the milk quality they were buying, as the falsification of raw milk occurred frequently (mixing milk with water, using neutralisation substances, antibiotics, bad quality raw milk and milk received from sick or treated cattle. The milk producers (farmers) and raw milk plants were opposed to each other as selling/buying raw milk prices were not properly established and were divided into two groups: "Agriculture" and "Milk Processing Industry". Sometimes, the raw milk control quality made in milk buying organisations was dubious as was the low personnel qualification. During this time, neither raw milk buying organisations, nor milk processing plant laboratories, obtained the required instruments (equipment), to ensure the quality and composition of saleable raw milk, that demands a new "Cow Milk, Quality Demand" Standard LST1137 and ES92/46 instructions.

In 1992, the Lithuanian Ministry of Agriculture, based on the specialists from Denmark (Knud Jorgensen, MSc.Agr, the Danish Dairy Board, Gunnar Henriksen, MSc. Dairy Technology, STEINS AS Laboratory, Villy Toft, Product Manager, FOSS ELECTRIC and others) began to implement the project for Three Baltic States, prepared by PHARE, "CATTLE PRODUCTIVITY, THE MILK COMPOSITION AND QUALITY CONTROL FOR PAYMENT PURPOSES SYSTEM IMPROVEMENT IN THREE BALTIC STATES".

The Project was aimed at raw milk payments, based on independent laboratory data and looked for a better relationship between the milk producer, milk plant, breeding organisations, Government authorised control organisations, raw cow milk and the products processed from this milk improvement.

The Lithuanian Ministry of Agriculture agreed to the main conclusions of this Project and on 16 July 1993, issued an order, No.562a, "For the Founding of an Experimental Milk Quality Control Laboratory"; and founded an Independent State Experimental Milk Quality Control Laboratory, which received authorisation to make milk composition and quality control modulation in a separate central laboratory.

The expert group from the Lithuanian Ministry of Agriculture, selected a place in the central part of Lithuania, in the City of Kaunas. The Academy of Veterinary was chosen to ensure laboratory potential use effectiveness for agriculture profile, for student teaching process and popularisation of advantage milk research ideas. For rational use of equipment and premises (from Soviet times), the old Kaunas breeders' enterprise regional laboratory, was joined with a new experimental laboratory.

In 1993, the Ministry of Agriculture established a qualified group of specialists from different departments, who prepared a detailed plan for milk research system reorganisation and provided the next steps for the laboratory development.

In 1992-1993, the reorganisation plan for the milk quality and composition research system was made for the next five years. The plan included changing the relations between the milk producer and milk processing plant, giving an opportunity for a milk producer to efficiently manage his farm and allowing the milk processing plant to have more flexible milk prices, with the main attention given to the raw milk composition and quality requirements.

At the same time, a group of scientists from the Lithuanian Food Institute, Lithuanian Breeding Institute, including other organisations, received an order from the Lithuanian Ministry of Agriculture to prepare the new raw milk purchasing requirements, based on the ES 92/46 instructions, estimating not only the milk fat, but also protein and other obligatory quality requirements. In a short time, in 1994, a "Cow Milk, Quality Demand" Standard LST1137 was prepared and approved on 29.02.1996, by the Lithuanian Standardisation Department, but this standard has not to date been introduced.

In 1997, a group of scientists, together with the specialists of the Ministry of Agriculture and Forestry of Lithuania, prepared the first editorship of a new standard: "Milk Purchase, Quality Determination and Payment

Regulations". In the first quarter of 1998 this standard was approved and on 26.03.1998 the Ministry of Agriculture and Forestry of Lithuania issued an order, No.152, "Introduction of new methods for the milk quality estimation and payment systems", which changed raw milk quality and composition estimation rules in all of Lithuania. The milk composition and quality research functions were assigned to the independent, neutral organisation and authorised central laboratory State Enterprise "Pieno Tyrimai" ("Milk Research").

The State Enterprise "Pieno Tyrimai" ("Milk Research") has obtained the latest milk test equipment and the rational system of sample delivery and data transfer to the customers has been introduced. The State Enterprise "Pieno Tyrimai" has a new, well finished laboratory premises, new electric supply installation, water supply, sewerage, local and external computer network, refrigeration room and necessary laboratory test equipment. The enterprise owns six refrigerating cars and 2 500 special containers (80 jars in each) for sample delivery purposes. The laboratory equipment allows the determining in a short time and precisely (in one sample) of fat, protein, lactose, dry matter content, urea, citric acid, analysis of bacteria pollution, falsification with water, inhibitor substances and the somatic cell count. This enables the diagnosis of some virus diseases and pathogenesis. The State Enterprise "Pieno Tyrimai" has the most modern instruments in the country. A milk research and milk sample identification system has been established.

The laboratory makes more than three million milk sample tests per year. In 1998, when the milk composition and quality research was made under separate requirements for the purchase of raw milk, the number of tests was significantly increased.

The State Enterprise "Pieno Tyrimai" laboratories, working under "Good Practice Laboratory" regulations, is able to ensure qualified milk tests, cattle selection, payments for milk, sanitation and consulting services, without using any other technical or financial resources.

- The State Enterprise "Pieno Tyrimai", following the LST 1137-97 standard and seeking that the raw milk composition and quality determination were carried out in the neutral organisation laboratory, make milk quality and composition measurements which are carried out for payment for milk purposes: fat, protein, lactose, bacteria pollution, somatic cell count, freezing point and inhibitors. The frequency and order of these measurements is indicated in LST 1137-97 standard and "Milk Purchase, Quality Determination and Payment Regulations".

Table 1. The instruments/equipment used in the laboratory "Pieno Tyrimai".

Instrument	Producers' name	Quantity	Carried out Tests
Combi (Lactoscope 550+Somascope MK2)	Delta Instruments	4	Fat, protein, lactose, somatic cell count
Lactoscope 550	Delta Instruments	2	Fat, protein, lactose
SYNERGY (AEGYS Mi600+ SCC500)	Anadis Instruments	1	Fat, protein, lactose, urea, somatic cells
Fossomatic 215	Foss Electric	1	Somatic cells
Asterias Cobra 2024	Biocom	3	Total bacteria count
Astori SE/DE4000	Astori Oscar	3	Milk freezing point
EL 9000 OMNI	Biotec	2	Inhibitors, the rests of antibiotics in milk, diagnostics of virus diseases.
GUARDIAN dosing system	Zenyx Scientific	1	Dosator
Kjeldahl automatic system "Vapodest 40"	Gerhard	1	Protein (Nitrogen)
Gerber System	Funke Gerber	1	Fat
CETI POLARIS	Ceti	1	Lactose
ALFA automatic system		1	Amount of Nitrogen

Table 2. Quantity of tests in the milk laboratory.

Year/Tests	Quantity of tests		
	Fat	Protein	Somatic cell
1993	2 300	2 300	-
1994	223 362	223 362	10 000
1995	500 932	500 932	27 744
1996	1 096 462	1 096 462	32 775
1997	1 136 894	1 136 894	727 363

Table 3. Testing of milk samples for animal breeding and processing plants.

		F\P	SC	BC	Inh	Freez. P.
1996	Breeding	1 096 462	40 720			
	Processing	9 626	1 215			
1997	Breeding	1 136 894	727 363			
	Processing	69 553	63 996		118	2 760
1998	Breeding	504 534	504 534			
	Processing	306 192	266 224	45 340	47 150	33 714

- The State Enterprise “Pieno Tyrimai” is a neutral and independent research organisation, having juridical status. Its structure and administrative jurisdiction is such, that interested persons or organisations cannot depend on the measurement results and objectivity.
- The State Enterprise “Pieno Tyrimai” has modern test equipment which is approved and used in EU countries for milk payment purposes. These instruments are included in the registry of the Measurement Instruments of the Lithuanian Standardisation Department; this equipment assures purchased milk quality and composition indices.
- The State Enterprise “Pieno Tyrimai” assures the milk sample collection, transportation of samples in positive low temperature and sample delivery to the laboratory from all Lithuanian milk processing plants, under the regulations and frequency of LST 1137-97 standard.
- The State Enterprise “Pieno Tyrimai” participates in international interlaboratory comparisons and seeks its accreditation.
- The International Audit was carried out by the German Sachsen-Anhalt, Land Quality Control Service (Landescontrollverband für Leistungs und Qualittatsprüfung Sachsen-Anhalt). During the examination (audit) the costs of milk sample tests were valued, the test results, data processing and the quality assurance are presented under GLP instructions and DIN EN ISO 9002 and DIN EN 45001 standards. The conclusion of the audit was positive.

Situation of milk recording in Poland

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Milk and beef production play a very important role in Polish agriculture. The whole cattle population is seven million heads and about half of them (3.5 million) are cows. These 3.5 million cows are kept in 1.3 million herds and 90% of these farms are private. An average private farm has 7.9 ha and less than three cows. The average Polish cow produces 3 325 kg milk (1997).

Farmers in Poland keep mostly dairy and dual purpose cattle. Beef cattle are kept in some beef herds and additionally, beef bull semen is used for commercial crossbreeding. The main race in Poland is black & white (90% of the whole cow population). In Poland in the past, this race was used for dual purposes. For some time it has been improved as a dairy cattle through crossbreeding with the Holstein. The second race is red & white (5% of population) which is used for dual purposes and dairy cattle. The rest of the races (Polish Red, Simmental and Jersey) make up less than 5% of the cow population and are kept rather regionally.

The number of cows dropped dramatically in Poland in the early 1990s (Table 1) due to liquidation and bankruptcy of the big State farms due to both social and financial reasons. Additionally, small private farms have also stopped cattle production due to small milk production profitability. During the last years, it could be seen that the cow population has been rather stable although a permanent small decrease is expected in the future. We expect that the increasing requirements for milk quality will be very difficult to fulfil for the small farms and therefore, these farms will stop milk production.

Presently, the Central Animal Breeding Office (CABO) through its branches (seventeen Regional Animal Breeding Offices with Milk Laboratories and nine Regional Insemination Stations) is responsible for milk and animal recording, herd book keeping, insemination, breeding data processing and breeding value estimation. It controls issues related to breeding dairy and beef cattle, pigs, poultry, fur animals and bees. CABO is the Governmental institution, which is 50% self-financed. According to the

new Breeding Law, CABO will change in the near future. Probably, regional insemination stations will be first restructured and then privatised and breeder associations will be responsible for herd book keeping.

CABO has represented Poland in ICAR and INTERBULL since 1994 when Poland joined these organisations.

Milk Recording (MR)

In the situation where herds are so small like in Poland, it is very difficult to run milk recording. However, even when the number of cows in the whole population decreases, the number of cows under milk recording increased in 1997 (Table 1). Unfortunately, the 364 000 cows under milk recording were only 10.6% of the whole cow population.

Table 1. Polish dairy cattle population.

Year	Cows Population		Cows under MR average performance				
	Total	under MR	Milk	Fat	Fat	Protein	Protein
	[million]	[thousands]	kg	kg	%	kg	%
1980	6.0	1058.5	3 279	129	3.92	-	-
1990	4.9	620.0	4 131	167	4.04	-	-
1995	3.6	342.0	4 287	173	4.03	140	3.26
1997	3.5	364.3	4 600	189	4.09	149	3.26

Also in 1998, the number of cows whose performance was evaluated increased to 383 000 by the end of June.

Cows were evaluated in 22 000 herds. In most of the herds (68%) had ten or less cows and in 25% of herds there were less than five cows. The average herd size under milk recording is seventeen cows but about 8% of herds have more than 150 cows.

Table 1 shows that during the last few years the average milk yield, as well as fat and protein yield, from cows under milk recording has increased constantly although milk production in different races has been on different levels (Table 2). Different milk yield could be observed in different races and also between cows of the same race. About one third of the black and white cows produce less than 4000 kg of milk per year.

Table 2. Performance of Polish dairy cattle under milk recording (1997).

Race	Milk kg	Fat kg	Fat %	Protein kg	Protein %
Black & white	4 610	189	4.11	149	3.24
Red & white	4 659	188	4.03	153	3.29
Polish Red	3 285	140	4.26	110	3.35
Simmental	3 658	145	3.95	123	3.36

Until the end of 1996, cows were evaluated using only the A4 methods. From 1997, we have started evaluation using methods A8 and AT4 because the costs are less than those of method A4. Additionally, farmers from big farms, who would like to receive results about cows performance every month, are interested in a method where technicians organise less work during a milking, so the AT4 method, where technicians come onto the farm for only one milking per month, fits very well. In 1997, we started evaluation using method A8 and in 1998, method AT4 was started as well. The method A8 used mostly in the herds under milk recording, has recently been started. The method AT4 is used mostly in herds larger than fifty cows. In June 1998, about 82%, 12% and 6% of cows were evaluated using methods A4, A8 and AT4 respectively.

Every milk sample is evaluated for fat and protein content. Presently, somatic cell counts (SCC) are evaluated only in four laboratories. Nevertheless, breeders from other regions could receive information about SCC as well if they request.

Our main reference milk laboratory (CLOM), which prepares standards for other laboratories from our laboratory network, is a member of CECALIAT. CECALIAT is an international organisation where milk testing laboratories could develop communication and collaboration between members for improved circulation of analytical information and which establishes an international accuracy system to improve accuracy worldwide. At least four times a year CLOM participates in an interlaboratory proficiency study and obtains good results. Last year CLOM received accreditation of the Comité Français d'Accreditation for reference milk testing methods.

Methods

Identification and registration

The system for identification and registration of breeding cattle has existed in Poland for more than twenty years. Every cow under milk recording receives a unique lifetime number, which is used for milk recording, herd books and insemination. Female calves born on the farm under milk recording, receive the twelve digit number within one or two months from birth. Similar unique lifetime numbers, but which contain only nine digits, are received by the breeding bulls, namely, bulls which are included in breeding programmes as offspring of mothers and fathers of bulls. The same kind of number is received by imported bulls or bulls whose semen is used for insemination in Poland.

From the beginning of 1999, every calf born on the farm under milk recording will receive a unique lifetime number within one or two months from birth. It will depend on the method used for herd evaluation (A4, AT4 or A8).

Also for twenty years, all herds where cows have been under milk recording, have received a unique number. Even when farmers decided to stop the cow evaluation, this herd number was still attached to the herd. All information about animal and herd numbers are kept in one central database.

Presently, animal numbers given by CABO are sometimes used by veterinarians. According to the new Veterinarian Law, veterinarians will be responsible for the national system of cattle identification and registration (I&R) in the future, but there are still no executive rules for this. We hope that the new I&R system will be useful for breeding conditions (for example the number should be unique for at least three cow generations) and we should also be able to introduce it as well. Otherwise, we will have to keep additional identification systems for cattle breeding.

Information system

CABO has its own information system for cattle breeding which covers all activities: milk and animal recording, herd books, insemination and breeding value. This system was started twenty years ago and is still being improved. CABO does not have its own computer centre but cooperates with the private company (ZETO Olsztyn) which runs the system. CABO together with this company tries to improve the system and solve the most important problems step by step.

In the information system pedigree data, data connected with milk recording, conformation traits' evaluation and insemination are collected. The latter ones could be used for fertility evaluation. The data connected with functional traits such as calving, reducing calf mortality, milking speed and temperament will be collected as from 1999. Data on the breeding value for milk traits are also included in the information system. More

time and especially more money are needed to include results of breeding value for conformation traits, which in the new version were evaluated for the first time this year.

Last year, according to great interest in the improvement of received information and in acceleration of the data feedback, CABO started consultations for the implementation of two projects. The first one, called "MALWA", was prepared for breeders who have five to twenty cows in the herd. The main goal of this project was to obtain information on test results, helpful for herd management, as fast as possible (5-7 days). This project included changes in the organisation of data flow for milk recording and insemination, starting a daily data processing, cooperation with organisations connected with agriculture (veterinary services, advisory centres, dairy plants and voivodship offices). The second project, called "OBORA", was prepared for breeders who have bigger herds where a computer is needed for good management. The main aim of this project was to prepare software and its implementation which would be helpful in optimal herd managing and optimal breeding at farm level.

The "MALWA" project was implemented in the Warsaw Region this year. For its implementation throughout the whole country, as well as for software preparation in the "OBORA" project, more time and money is needed than we could spend this year.

One of CABO's main goals is to receive the ICAR Special Stamp. We hope that during this year and next year, changes in our organisation will be completed and we will find solutions for some organisational and technical problems (for example milk balance legalisation), and during the next year, we will be able to apply for the Stamp.

Poland would also like to join the international bull evaluation made by INTERBULL. Probably this autumn, after changes in the method of genetic bull evaluation, the first results will be sent to Uppsala.

Future activities



Milk recording and cattle identification in the Slovak Republic

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Milk recording in the Slovak Republic is carried out by an independent, non-profit, contributory organisation, the State Breeding Institute of the Slovak Republic, established by the Ministry of Agriculture of the Slovak Republic. The objective of this organisation is to perform milk recording.

On 1 January 1998, 226 213 cows (73.6% of all cows bred in Slovakia) were being monitored within the programme of milk recording. The development of the basic indexes (number of breeds, number of recorded animals, etc.) describing milk recording of the I. grade during the five-year period since the foundation of the ŠPÚ SR, is reflected in the following table:

Session 1. Situation of milk recording in the Slovak Republic

Index Year	1992 from 1.7.92	1993	1994	1995	1996	1997
CP - A ₄	324	309	272	286	208	219
Number of breeds						
CP - A _T	1 076	1 048	1 099	1 149	1 143	1 282
Number of breeds						
CP - A ₄	59 922	51 558	43 342	44 119	37 042	31 108
Number of animals						
CP - A _T	210 225	199 711	204 509	205 235	206 678	195 105
Number of animals						
Total number of breeds	1 400	1 357	1 371	1 435	1 351	1 501
Total number of recorded animals	270 147	251 269	247 851	249 354	243 720	226 213
Total number of animals	396 794	343 222	359 348	352 781	331 113	307 394
% of recorded animals	68.08	73.21	68.97	0.68	73.61	73.6

Table 1. National milk production.

Total number on 01/01/1998		Average production per cow and per year		
Dairy cows	Dairy herds	Milk	Fat Protein % volume	Protein
307 394	2 050	3 604	3.73	3.13

Table 2. Position of milk recording.

Recorded herds		Recorded cows	
Number	Percentage	Number	Percentage
1 501	73.22	226 213	73.59

Table 3. Recording methods. Percentages of cows recorded according to the various methods recognised by ICAR.

	A3	A4	AT	A...	B...	B...	C...	Altogether
Percentage of recorded cows		13.75	86.25					100%

Table 4. Results of milk recording.

	All breeds together	Main breeds with at least 1000 lactation results			
		SS	SP	H	SS x H
Milk yield per recorded cow - kg					
Average	3 878	3 353	2 915	5 053	3 880
Number of lactations	144 573	18 813	5 262	12 313	25 253
Length of the lactations - days					
Average	291	291	289	295	290
Butterfat content %	4.03	4.03	3.99	4.06	4.04
Protein content %	3.16	3.18	3.18	3.15	3.17

SS- Simmental.

SP - Pinzgauer.

H - Pie Noire Holstein.

SS x H - Cross - Breeds.

The animals are marked immediately after birth in order to preserve the identity of the animal. Within 72 hours, this marking is replaced by a plastic earmark or tattooing, this is done by the farmer. On some selected farms, a worker marks the calves on days 26 to 34 after birth by a metal earmark (a permanent marking) with a code which is identical to the code on the plastic earmark.

Session 2. Cattle identification

Methods of marking

An individual pedigree certificate will be issued for each animal recorded in the breeding book, upon request of the Association of Breeders. This includes the breed, sex, a clear identity of the animal, the father and mother of the animal, their fathers and mothers and the date of birth.

The pedigree certificate

All basic data is sent to the Computing Centre of the ŠPÚ SR - specialised breeding establishment in Zilina, where it is processed. At the same time it is archived. Centralised data processing is performed at two-week intervals. Once a year the results are officially published in the "Yearbook".

Session 3. Computer developments and data processing

Based on the collected data, the results of inheritance analysis of breeding bulls in insemination are periodically processed and published. The results of the analysis are officially published twice a year and are available to a wide public. In May 1997, the results of this analysis were for the first time published using the latest method, Animal-Model-Test Day Mode (AM - TDM), which is becoming the official method of genetic evaluation of cattle in the Slovak Republic. The Slovak Republic ranks amongst the first countries in the world, in which this system had been successfully tested and is now being implemented into routine inheritance controlling.

Milk recording is on the whole carried out by the ŠPÚ SR through:

- thirteen regional centres;
- the Central Computing Centre in Zilina;
- the Central Laboratory for Milk Sample Analyses in Zilina;
- the specialised breeding establishment in Nitra.

Session 4. Organisation and financing of milk recording

The ŠPÚ SR has its own laboratory of immunogenetics in the City of Nitra where all paternity tests are carried out upon request. The paternity is done by identification of the covering male animal at the time of covering.

Methods of establishing the paternity

**Methods of
controlling the
performance**

The control of performance (CP) is carried out only on the farms that have been selected, upon the request of the farmer, by affinity associations of farmers or official organisations. They take care to select the best herds for a permanent growth of the quality of the gene pool. The ŠPÚ SR uses the method "A" for the CP, which includes a control of quantity of milk, fat, protein, lactose and other components if necessary (somatic cells, urea). It is carried out in two variants by an entrusted person of the ŠPÚ SR.

- **Variant A₄** - a standard reference method, carried out in intervals of 28 to 30 days of all milking of the controlled day for 24 hours. Nowadays, this method is used for 31 108 cows (1 January 1998).
- **Variant A_t** - the control is carried out on average at 30-day intervals of one milking, alternatively one month in the morning, the next month in the evening, twelve controls in a year. This variant now includes 195 105 cows.

The following milk measuring machines, acknowledged by ICAR, are used to find out the milking capacity:

- Tru - Test **2 093** pcs

**Checking the
adherence to the
breeding law in
slovakia**

This agenda is taken care of by the State impartial organisation, the Breeding Inspection of the Slovak Republic, which is responsible for abiding to the Slovak Technical Norms and other rules.

**Checking the milk
performance**

The farmer must create conditions for a regular control. After calving, the control takes place the next day, but not before the evening of the fifth day of lactation. If there are two milkings, the control usually starts in the evening and ends in the morning. If there are three milkings, then the control of the whole stable starts at noon and ends in the morning. For each stable, there is a control period, which must not be shorter than twenty-six days or longer than thirty-four days. The numeric marking of the time of control and of the interval between milkings is worked out in the principles ASD of the system of Performance Control. The cows must be milked in the usual way on the day of control and change in the way of milking is forbidden.

**Symbols used in
performance data**

All symbols are processed and explained in the principles of the ASD system. We take the liberty to claim that the ŠPÚ SR is ready, in the process of getting the special seal, to prepare and present all documents required by the special Commission. At the same time, we guarantee that we will present all information that the Commission might consider important and we are also ready to pay all costs of the Commission.

Cost price of milk recording per cow and per year, according to the recording method expressed in litres of milk.

Cost and financing

Table 5. Price paid by the farmer as a percentage of the cost price, according to the recording method.

	A3	A4	AT	A...	B...	C...
Cost price per cow and per year - litres of milk		29.4	19.9			
Percentage of cost price paid by the producer		67	67			

The basic philosophy and objective of the State Breeding Institute of the Slovak Republic, which is responsible for milk recording in the Slovak Republic, is to constantly improve the whole system of recording in order to make it an effective tool helping the breeders to advance cattle breeding.

Session 5.
Activities of
milk recording

The main contribution of milk recording is that all data collected within the programme of milk recording is processed into outputs, which can be used in analyses of the state of cattle breeding or for identification and elimination of possible faults. At the same time, the results can be used as a basis for comparison between different breeders.

The outputs are periodically provided to the breeders directly from the Computing Centre of the State Breeding Institute of the Slovak Republic in Zilina (routine processing), according to closed contracts. These are for example, monthly results of milk recording (monthly reports), life-long performance results, lists of new-born animals, closing outputs of milk recording, results of performance control of calves and young animals. Furthermore (within the programme "Plemservis"), the breeders can ask for operative analyses of the respective herd directly from the Regional Centre of the ŠPÚ SR. Regional consultants then provide the breeders with the following analyses of the respective herd or farm:

- performance of animals according to paternity for standard lactation;
- composition of the dairy herd according to paternity;
- composition of the heifer-herd according to paternity;
- composition of the dairy-herd according to age and ongoing lactation;
- breed composition of the recorded dairy-herd;
- closing performance controls (last closed standard lactation of living animals);

- the structure of the dairy-herd according to milk-yield for closed lactation;
- list of the best animals in breeding;
- a survey on the average milk yield of living animals, daughters of particular bulls, according to the ongoing lactation;
- list of animals at classification.

Cattle identification and milk recording in Slovenia

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Slovenia has about two million inhabitants and 785 434 ha of agricultural land, of which 63% is grassland and pastures. Therefore, cattle production plays a dominant role in animal production being 60% of its income. Milk production is expanded all over Slovenia. The number of cattle in 1997 was 495 535.

In Slovenia the first animal production community was settled in Selce near Škofja Loka in 1906. Milk recording was first introduced to the ex-State farms and was later spread to private herds that started with more intensive market milk production between 1970 and 1980.

In 1984, Slovenia asked to become a full member of the International Committee for Animal Recording (ICAR) even though it was a part of ex-Yugoslavia. In 1986, Slovenia became a full member of ICAR and its Subcommittee, INTERBULL, during a session held in Brussels. We tried to have the right to use the Special Stamp on official documents and recording results for ten years. In May 1996, Dr J. Crettenand from Switzerland and Dr Batchelor from England, both inspectors from ICAR, visited Slovenia at the request of breeders and expert services. They assessed our milk recording, starting in herds and followed by sample taking, milk analyses in laboratories, data processing in central services, pedigree records in regional centres and animal registration. On the basis of their report, Slovenia was awarded the right to use the Special Stamp "QUOD SCRIPTUM EST MANET" on all official documents and reports that denote the origin and production data of our registered animals and their offspring.

In Slovenia, milk recording follows the A4 method, according to which an interval of 22 to 37 days is allowed between two milk recordings. In a year, at least eleven milk recordings are performed in the registered herds. Milk recording controllers measure the amount of milk in the evening and morning for all cows that are milked on the day of milk recording. Milk samples are taken of all cows in proportionate shares from two milkings according to ICAR instructions. Samples of milk are delivered

Session 1. Situation of milk recording in Slovenia

as quickly as possible, to laboratories at regional selection services. Contents of fat, proteins and lactose are determined. If laboratories are equipped for cell count, they do it for all milk recorded cows in a herd. Cell count is in use for recorded cows in the Primorska and Gorenjska regions. In Central Slovenia (Ljubljana), SCC is determined only for breeders who demand it. Determination of urea in milk has recently been included into milk recording in Gorenjsko.

The following tables show the number of milk recorded cows between the years 1986 and 1997 by breeds.

Table 1. Milk recorded cows - review by breeds.

Year	Simmental	Brown	Black and White	Others	Total	% recorded cows
1986	31 364	20 640	10 521	600	63 125	28.1
1990	29 253	17 038	11 402	431	58 124	29.8
1993	30 835	17 566	14 479	436	63 316	32.3
1996	31 231	17 230	16 752	542	65 755	37.6
1997	31 240	17 373	16 935	632	66 180	39.1

Table 2. Number of breeders and milk recorded cows - review by sectors.

Year	Breeders (A + AP method)			Cows (A + AP method)		
	Family farms	Farms*	Total	Family farms	Farms*	Total
1990	8 027	62	8 089	50 063	8 061	58 124
1993	7 910	43	7 953	53 940	7 030	60 970
1996	7 442	28	7 470	58 848	6 927	65 775
1997	7 430	27	7 458	59 412	6 311	65 723

Table 3. Average milk recordings per herd regarding sector and controller.

Year	Average nr. of cows per recorded herd			Controllers	Cow: controller ratio
	Family farms	Farms*	Total		
1990	6.2	130	7.2	246	236
1993	6.8	163	7.7	241	253
1996	7.9	247	8.8	243	271
1997	8.0	234	8.8	237	277

Table 4. Average milk production of all milk recorded cows in Slovenia in standard lactation (305 days) in 1997 by breeds.

Breed	No. of lactations	Milk production, 305 days		
		Milk kg	Fat %	Prot. %
Brown	16 872	4 446	4.08	3.25
Simmental	30 327	3 951	4.06	3.26
Black and White	16 395	6 019	4.04	3.20
Total	64 701	4 615	4.06	3.24

Table 5. Average milk production of all milk recorded cows in Slovenia in standard lactation (305 days) regarding the sector in 1997.

Sector	No. of lactations	Milk production, 305 days		
		Milk kg	Fat %	Prot. %
Family farms	59 135	4 454	4.08	3.24
Farms*	5 566	6 329	3.90	3.22
Total	64 701	4 615	4.06	3.24

* *Ex-State farms in transition*

In Slovenia two methods for milk recording are in use: A and AP methods. Both methods are equal regarding milk recording performance in herds (measurement of amounts of milk, sample taking and milk analysis), but they differ in data processing of monthly recordings. According to the A method, breeders receive a settlement after lactation is finished and concluded (the methodology of lactation calculation is equal in both methods). The AP method breeders receive monthly recording results immediately after the recording and at the end of lactation, calculated lactation settlement with all known lactation and at the end of the year, an annual summary. Slovene breeders would like the AP method to be used by all recorded herds.

We would like milk recording to also include regular cell count for all milk recorded cows. Some breeders need data on urea content in milk of some cows to achieve better production results and herd management. Our objective is to meet the needs of breeders within the milk recording service with nutrition, economy and health data of stables.

Due to high milk recording expenses, the AT method will be introduced into all smaller herds. If the AT method is introduced, more herds can be included into milk recording. At present 39% of all dairy cows are recorded, which is very little in comparison to developed countries (Scandinavian

countries). In Slovenia, more and more breeders would like to have their herd milk recorded. The A4 method will be used for bigger herds and for herds with bull dams.

Session 2. Cattle identification and registration

Herds that are milk recorded should have all calves that are born between two recordings registered. Calves from the milk recorded herds should be registered at the latest thirty days after birth. Each calf has two plastic eartags in each ear; plates contain identification data that are obtained by the Cattle Service of Slovenia. The plastic ear plate (produced by Alfaflex) contains the code of the country (SLO), the code of species and uniform life-number of the animal, which is a seven digit number and can never be repeated with any animal of the same species.

All foreign animals (purchased) keep their original life number so that the place of origin of purchased animals can always be identified. Animals are registered on a central database with the original life number and country code that can be read on the ear plate.

Controllers register new born calves in herds that are not milk recorded, but their milk is formally purchased. For the time being calves from non-recorded herds are registered and entered into the database twice or three times a year (Z control). It is expected that controllers will start to register all calves born in the region every month beginning on 1 January 1999. This is a regulation of the EU as well as being a new regulation on obligatory registration of all animals.

Our controllers register about 140 000 to 150 000 calves a year on about 25 000 farms. Calves have yellow plastic numbers in both ears. A controller fills a registration form for each calf. He should enter sex, calving ease and owner's name. All further moving (from herd to herd) and owner changes as well as removal of the animal (slaughter) should be entered too. Data on animals are entered into local databases in the regional centres. Every month data is transferred to the central database at the Cattle Service of Slovenia.

Session 3. Computer developments and data processing

Present status

A software program for milk recording, pedigree and selection data is CLIPER. New software for an information system for cattle breeding and animal production is ORACLE.

All six regional centres are equipped with PCs (386, 486, Pentium) and local networks. More powerful computers are located at the Agricultural Institute and at the Biotechnical Faculty Zootechnical Department where data are processed and breeding values calculated. All computers are in a network. Regional centres, laboratories for milk analysis and both central organisations have on-line access to internet and email. Data that are entered in regional centres are mailed to the central base every week or

month. Data on milk analyses are transferred to the central database every day, where they are processed and the results printed. Feedback information is mailed from the central database into local databases.

CVI links (centrally managed information system at Government level) will enable data on milk recording, registration and identification to be collected in the central database only. Data will be entered at different levels (controllers, laboratories, regional centres, slaughterhouses, inspectors, etc.).

Bigger breeders have already bought and use computers and will have access to email. Therefore, data on amounts of milk per cow will be entered daily directly from milking parlours. Milk outflows for each cow can be monitored in modern milking parlours. The use of feed mixtures in herds that are equipped by transponders and automatic feeding mangers will be monitored too. The usage of feed mixtures will be controlled daily by computer.

Soon after the recording and data processing, breeders receive feedback information in their local databases on their PC using special protocols. Between breeders and the central database, lines for transfer of data on changes in herds will be established.

Milk recording in Slovenia is manifold. Milk recording results and prints help breeders to manage herds and farms. It is very important that milk recording results are precise and available to breeders two or three days after the recording. Breeders are helped to manage the herds by experts from advising and veterinary insemination services. Selection is managed by experts from a selection service. Recording results and all other information obtained by our service are very helpful to all expert services that are included in the production of quality milk and breeding animals.

Milk recording is especially important for selection services. In Slovenia 210 000 cows and 30 000 heifers are inseminated every year; 65 000 cows, which is 39% of all dairy cows, are milk recorded. About 600 cows are bull dams, which is less than 1% of recorded cows. Prospective bull dams are chosen and registered as dams of future bulls on the basis of calculated breeding values and measured physical traits and exterior marks. Bull dams are inseminated by semen of best bulls of a certain breed (domestic and imported).

About 180 young bulls for planned mating are bred in two centres. After the finished performance test that lasts between 165 and 365 days, 50 sires are selected every year according to the test results and placed in the insemination centres. Between 40% and 50% of cows are sired by young sires and between 50% and 60% by semen of positively tested sires. At

Future status

Session 4. Scope of recording services

first, each young sire produces from 3 000 to 5 000 semen doses. While waiting for the final test results, 10 000 to 20 000 semen doses are taken and stored. For the selection of bulls and yearly confirmation of AI use of sires, the milk recording data are essential.

Breeding values for milk production traits, milk (kg), fat (kg), protein (kg), as well as fat and protein content are estimated twice a year for all milk recorded cows. The bull dams are selected on the basis of IFP index (fat and protein index), which is:

$$\text{IFP} = 2 * \text{BV kg protein} + \text{BV kg fat}$$

The breeding value is estimated twice a year for all bulls according to the BLUP method and specific models, but various effects that are eliminated in the phase of pre-adjustment or in the model are considered as well (Pogacar, 1997).

Slovenia is included in the international comparison of breeding value estimations of bulls and transfer all data regularly to the INTERBULL Centre in Uppsala. Recording results are an important form of information and are at the disposal of various Governmental and expert bodies like the Ministry of Agriculture, Chamber of Agriculture, Chamber of Veterinary, dairies and meat processing units and the Statistical Office of Slovenia.

Session 5. Organisation and financing of milk recording

The Milk Recording Service in Slovenia is organised and financed by the Ministry of Agriculture, Forestry and Nutrition. The Cattle Service of Slovenia consists of a central service (Agricultural Institute and Biotechnical Faculty) and six regional centres (Murska Sobota, Ptuj, Celje, Kranj, Ljubljana and Nova Gorica).

Six laboratories analyse milk and belong to six regional centres. Laboratories have MILKOSCANS (diverse capacity). Some laboratories have FOSOMATIC for somatic cell counts. The mentioned six laboratories and other laboratories which analyse milk for dairies, are part of a network for milk sample exchange. The Laboratory of the Dairy Institute that is a part of the Biotechnical Faculty, Zootechnical Department (BF), is a referral laboratory. The laboratory of the BF Dairy Institute is included in the international network for assessment of results because Slovenia is a member of the ICAR Reference Laboratory Network led by Mr Oliver Leray. Slovenia exchanges results with referral laboratories in Europe (Denmark, France and Germany). All laboratories in Slovenia are included in the national ring test and are calibrated with the referral laboratory of the Dairy Institute. Table 6 displays herds and milk recorded cows by regional institutions.

Table 6. Number of herds and milk recorded cows - review by regional centres in 1997.

Regional centre	Herds, A + AP methods			Cows, A + AP methods		
	Family farms	Farms	Total	Family farms	Farms	Total
Murska Sobota	1 839	-	1 839	10 287	-	10 287
Ptuj	1 539	3	1 542	11 946	339	12 285
Celje	998	4	1 003	11 377	595	11 972
Kranj	336	6	342	5 139	1 060	6 199
Ljubljana	1 848	9	1 857	15 273	3 342	18 615
Nova Gorica	870	5	875	5 390	975	6 365
Total	7 430	27	7 458	59 412	6 311	65 723

Table 7 shows the average number of cows per milk recorded herd in each regional centre. Smaller herds are in the eastern part of Slovenia where milk production has been omitted due to pig production and in the western part of Slovenia (Primorska) where farming has been omitted owing to aggravated production conditions. Young people leave these mountain and carst regions and only the older people remain.

Table 7. Average number of cows per milk recorded herd referring to sector and controller in 1997.

Regional centre	Average nr. of cows per recorded herd			No. of controllers	Mean no. of cows/controllers
	Family farms	Farms	Total		
Murska Sobota	5.6	-	5.6	29	355
Ptuj	7.8	113	8.0	48	256
Celje	11.4	149	11.9	44	272
Kranj	15.3	177	18.1	18	344
Ljubljana	8.3	371	10.0	66	282
Nova Gorica	6.2	195	7.3	32	199
Total	8.0	234	8.8	237	277

Milk recording is financed by the Government for the time being. In Slovenia about 240 controllers are employed and about twenty senior controllers, who are responsible for milk recording and selection, registration and identification and pedigree data keeping in our herds.

The average cost of milk recording per cow is equal to 180 kg of milk a year. The expenses are paid by the Government. Breeders would, in the future, like to have other traits measured, like somatic cell count, contents

of urea in milk, nutrition and economic data and other prints within milk recording services but they should pay a part of the costs. In the future, the Government will not be able to cover all milk recording costs. Therefore, financial resources for milk recording and animal registration should be rationally used. Serious considerations have already been started in connection with the AT method, reduction of laboratories for determination of milk traits and quality of milk and restructuring of control services for milk recording and data processing.

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Concluding remarks

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In Central and Eastern European countries cattle identification and milk recording have a long history: in the major part of countries they were put in practice in the period between the two world wars or even at the beginning of this century. Performance control methods and systems as a base of animal breeding and improvements in production traits followed changes in economic and social environment as well as in breeding objectives and technologies. Transition from the centrally planned economic to the market oriented systems, accompanied with privatization of production assets, the changed role of the state and, in majority of countries, the establishment of new farm structures, have imposed the need for adjustments and changes in the general approach, funding and methods of work of services and organizations involved in animal recording. The attainment of general policy objectives, such as broader integration in the world market, require the implementation of norms and standards developed by the competent international organizations and approved by the major subjects in the international trade. Like in many other activities, the integration in the European Union, adopted as a policy objective by a majority of countries concerned, require a harmonization of methods and standards in cattle identification with EU norms and practices.

In coping with these complex problems, recording services in CEE countries have acquired a wealth of experience and knowledge. Although conditions and problems vary from country to country, some general principles have been found valid for all or for a group of countries in the sub-region. The experience of West European and North American organizations has been used to a maximum possible extent in developing solutions adapted to local conditions. A substantial technical and financial support provided by the international governmental and non-governmental organizations played an important role in the process of transition and adaptation of animal recording according to new conditions.

For these reasons, the ICAR initiative to organize a round table on cattle identification and milk recording in Central and Eastern European countries was welcomed by its member organizations from this part of the world. It was supported by the FAO (Sub-Regional Office for Central and Eastern Europe and the Animal Production Division) and by the European Association for Animal Production as an action complementary to their programmes in support of restructuring the animal production sector in CEE countries.

The Round Table has met all expectation of participants and organizers. An overview of the current status of milk recording, cattle identification and registration in ICAR member and non-member countries in Central and Eastern Europe has been presented in country papers published in this publication. In addition, an open and fruitful discussion that followed each presentation offered a variety of views and proposals for more efficient work at country level as well as for the improved international cooperation in this field.

As can be seen from the papers submitted at the Round Table, in all countries of the Central and Eastern Europe there are well organized and functional milk recording services. From the organizational point of view, the major part of them is established as independent entities operating under the license issued by the Ministry of Agriculture. They apply ICAR guidelines and control methods in accordance with the local conditions, farm size and costs of operations.

In principle, costs of milk recording are paid by producers. Fees paid by producers vary. In general, they depend mainly on the herd size: they are lower in countries with large herds and higher in countries characterized by small production units. However, participants at the Round Table have recognized the possibility of decreasing costs to producers by improving quality and efficiency of services offered by recording organizations. In this respect, they have underlined the importance of the adequate implementation of ICAR's guidelines as minimum requirements for uniformity of recording combined with maximum flexibility in the choice of methods.

A decisive role of the state in promoting cattle identification and milk recording and in providing direct support to recording activities has been recognized by all participants. In the majority of countries, the state supports milk recording activity through subsidies for regular operations, the direct provision of equipment and training of staff. The animal recording and particularly animal identification in CEE countries contribute to the provision of public goods, such as protection of human health and protection of consumers. Participants felt that the process of transition from the state supported into an economically self-relying system should be carefully managed taking care of public interest and importance of identification and recording activities. In the future, customers - breeders

should cover the major part of costs of recording, but that at least a part of identification and recording activities should be financed by the state. A declining state support and the tendency to reduce budgetary expenditures impose the search for additional sources of income primarily by enlarging the scope of recording to cover some aspects of the health and nutritional status of herds and individual animals (e.g. somatic cell count, urea content). Several impressive examples of introduction of new products and services as well as of experiences in implementing the most up-to-date data processing methods are to be found on previous pages of this publication. They will certainly inspire other colleagues for similar undertakings.

Recording organizations from a number of countries operate under difficult conditions, particularly with regard to the technical quality of the available equipment. However, as expressed by participants at the Round Table, they are striving to make the best use of the available equipment, often out-dated, and to provide their clients with services of the highest possible quality. In some cases, the external financial and technical assistance was a decisive factor in up-grading the quality and accuracy of recording.

Participants reached a unanimous conclusion regarding the cattle identification issues. They recognized that the EU directive, although binding EU members only, was to be implemented in all ICAR member countries of the sub-region, particularly in view of their trade relations with the UE countries and/or their potential admission to the Union. In this respect, they plead for the unified system based on the life-long ID number which would be equally valid and applicable for health control and breeding purposes. In order to avoid additional costs to producers, the existing systems and data bases should be used to the maximum possible extent and combined with new requirements. In this respect, bearing in mind that the situation in CEE countries does not differ from the one in Western Europe, a close cooperation among all countries concerned and coordinated approach under the aegis of ICAR was recommended.



**Round Table: Cattle Identification and Milk Recording in
Central and Eastern European Countries, 23 August 1998,
Warsaw, Poland
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