
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

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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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