Report of the Working Group on Performance Recording of Dairy Sheep

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Abstract

The report of the working group on performance recording of dairy sheep presents the activities carried out over the last two years, in relation with the responsibilities assigned to each group in a policy paper from the board in July 2011. The main activities focused on the preparation of amendments to ICAR guidelines about the topics of udder morphology and methodology for quality assurance regarding AC method, as well as the valorisation of the database resulting from the on-line questionnaire. The survey, open to every ICAR members, was filled in by 13 countries over 2010 and 2011. 1,319,000 ewes are reported to be recorded, 91% of them through simplified designs. France, Italy and Spain represent 89% of the activity of milk recording. In co-operation with other bodies of ICAR, especially with the recording devices sub-committee, the requirements of the accuracy of the devices were maintained. The automated milk recording devices on-farm is an issue to be addressed in the next years.

Keywords: dairy sheep, milk sheep, milk recording, guidelines, ICAR

1.0 Introduction

In 2011, after suggestion made to the board in 2010, the working group changed its name, from "milk recording in sheep" to "performance recording of dairy sheep" to be relevant with the introduction of udder morphology in the field of the considered traits. In July 2011, the board produced a policy paper summarising the responsibilities of sub-committees (SC) and working groups (WG): (i) provide economic methods, guidelines and protocols; (ii) investigate, research and propose new developments with economic benefits; (iii) ensure group personnel have the required skill-set and draw its members from a reasonable range of locations & business/academic bases; (iv) promote work of the group through all available channels and through the liaison with other ICAR groups, make regular report to the board, maintain liaisons with other relevant non-ICAR organizations; (v) aid and assist in the personal development of the group members. The main activities of the performance recording of dairy sheep WG during the last 2 years may fit with the above responsibilities: preparation of the amendments to ICAR guidelines about the topics of udder morphology and methodology for quality assurance regarding AC method; valorisation of the database resulting from the on-line questionnaire; cooperation within ICAR; active participation to the sessions on small ruminants organised at each ICA R biennial session.

2.0 Main activities of the working group during the last two years

2.1 Constitution of the Working Group

After a process of renewing the members of the Working Group over the last 4 years, the constitution of the group has remained unchanged since Riga. The members are:

-Jean-Michel Astruc, Institut de l'Elevage, France

-Zdravko Barać, Croatian Agricultural Agency, Croatia

-Francis Barillet, INRA, France

-Antonello Carta, AGRIS Sardinia, Italy

-Elisha Gootwine, Volcani Center, Israel

-Drago Kompan, University of Ljubljana, Slovenia

-Franz-Josef Romberg, Dienstleistungszentrum Ländlicher Raum Westpfalz, Germany

-Alessia Tondo, AIA, Italy

-Eva Ugarte, Neiker, Spain

In addition, like any other SCs and WGs, a board member has been nominated as "watching briefs" over the activities of the group. Clara Diaz has been appointed for this mission in the performance recording of dairy sheep WG.

2.2 Meetings involving the Working Group of Performance Recording of Dairy Sheep

The last 2 meetings of the Working Group were held in Riga (Latvia) on 1st of June 2010 with 6 attending participants and in Cork on 29th of June 2012 with 9 participants. The main issues of the agenda were: the changes in the name and constitution of the Working Group (Riga), the overview of the main activities of the group over the last 2 years (Riga and Cork), the presentation of the results of the on-line dairy sheep enquiry (Riga and Cork), the requirements for recording devices in sheep (Riga), the amendments of the guidelines: quality assurance for AC recording, inclusion of udder morphology in the guidelines (Riga and Cork), topic of automated on-farm recording devices (Cork).

Between two biennial sessions, the exchanges were mainly done by e-mail.

Meeting of the ICAR Board with Chairpersons in Bourg-en-Bresse (France) on 21st June 2011 – The chairman of the Working Group attended this meeting and presented a synthesis of the works on-progress.

2.3 Updating the ICAR Guidelines of sheep milk recording

The last evolutions date back from 2005 and are reported in the guidelines published in the booklet "International Agreement of Recording Practices" (ICAR guidelines, 2010), in the section 2.2.

2 new issues were discussed over the last 4 years and are now ready to be included in the guidelines.

-Quality assurance for AC method. The AC method requires the information of the whole milk of the flock produced over 24 hours to calculate the AC coefficient applicable to each ewe recorded at the recorded milking to obtain a daily production. Some situations are identified in which the AC method procedures cannot be applied without producing biases: flocks where a part is registered and therefore recorded, whereas the bulk milk contains the whole flock; flock where a part of the ewes are milked once a day whereas the other part is milked twice a day; preferential treatments. Even though such practices should not occur regarding the guidelines, a procedure of quality assurance is proposed both to control and, if possible, to elaborate an alternative AC coefficient. The main features of the procedure will be described in the guidelines, the entire procedure being available in a document produced at the ICAR meeting held in Cork and displayed on the ICAR website. Basically, this procedure consists in introducing one monthly record at the two milkings per flock-year in order to check the quality of the AC design in the flock. This approach should permit to obtain a flock coefficient (average of individual coefficients) either to be directly applied to all test dates or to check the quality of the actual AC coefficients.

During the Cork meeting, the following motions or precisions were adopted: *(1)* the problem concerns not only AC method but also AT method and therefore must be globalized to all simplified methods; *(2)*

before setting up the procedure of quality assurance, which is costly, it must be first suggested to the breeder that he separate the ewes not registered or milked once a day; *(3)* in the case of some ewes are milked once a day and in the situation where the breeder does not want to separate the ewes, it is necessary to know which individual ewes are milked once and which are milked twice; *(4)* in the case where an AC coefficient is obtained through the quality assurance procedure at one test-day, it is important to check that in the given breed, the coefficient is stable enough over the test-day, in order to avoid a bias; *(5)* setting up the assurance procedure is optional and in any case is not mandatory. It should be considered as a possibility when the situation requires it; *(6)* the quality assurance concerns only milk yield and not samples

-Recording of udder morphology. Among the functional traits whose interest is growing with the global purpose of reducing the costs of production, the traits related with udder health and udder morphology are more and more recorded. Whereas somatic cell count is a standard indicator for udder health, the scoring of udder morphology takes different forms according to the breeds and the countries. The guidelines aim at *(i)* proposing different traits that may be scored, according to the specificity of each breed, *(ii)* listing references for genetic parameters, especially regarding the relationship between milk traits and udder traits. There is no recommendation, because there is at this stage no need of harmonization. As in cattle (section 5.1 of the guidelines), linear traits are scored individually, the scores covering a biological range. They describe the degree of trait, not the desirability. The recommended scale is 1-9. Udder appraisal tables contain several traits. The traits scored in at least one breed/country are the following:

1. Teat position
2. Udder depth
3. Udder attachment
4. Udder cleft
5. Teat size

2.4 Co-operation with the relevant Sub-Committees and Working Groups of ICAR

The WG co-operated over the last 2 years with the following bodies of ICAR:

-Cross-participation with the WG on Milk Recording in Goats, the chairman of each group participating at the work of the other group. We had proposed in Riga to organize a joint meeting of both WG at each biennial session. Nevertheless, the agenda is fully booked in both WG so that a joint session would not be relevant at this stage.

-Co-operation with the Sub-Committee on Milk Recording Devices about the requirements for sheep. The WG had proposed in Riga to keep the requirements of the devices for sheep as they are, without relaxing them. This proposition has been agreed.

2.5 Dairy sheep enquiry on-line

Since May 2006, the on-line database has been ready to accept submission of data. The purpose of the database (developed and maintained with the help of ICAR Secretariat) is to collect data about the situation of milk recording in sheep, and related connected issues such as breeding schemes, selection criteria, molecular information in sheep, recording devices. This annual survey constitutes one of the main terms of reference of the performance recording of dairy sheep WG.

The dairy sheep enquiry is divided in 7 tables, representing 7 different topics: (i) basic information on population, recording methods and percentages; (ii) milk yield: type of lactation calculation + milk yield results; (iii) optional test for milk composition; (iv) recording of non-milking traits; (v) milk recording equipment used in case of machine milking; (vi) breeding programs using insemination (AI); (vii) molecular information.

On the whole, in 2010 and (or) 2011, 13 countries have answered the on-line enquiry. We acknowledge these countries for this co-operation and for their help to have an updated overview of the situation of dairy sheep milk recording.

The raw data of the survey, produced by ICAR Secretariat, are available on the ICAR Website.

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The main results of the on-line enquiry were presented at the plenary session in Cork. In addition, a comprehensive valorisation of the data from the last 2 years is available on the ICAR site, in the page dedicated to the Performance Recording of Dairy Sheep WG (http://www.icar.org/pages/working_groups/wg_Performance_recording_dairy_sheep.htm). This valorisation is proposed in a Power-Point document of more than 50 slides with tables and figures.

Basically, all ICAR members should have answered the enquiry, even to declare no dairy sheep breeding. Finally, members with no dairy sheep milk recording do not answer the enquiry.

The main results of the on-line enquiry are described below.

3.0 Dairy sheep enquiry on-line: situation of milk recording in dairy sheep

3.1 Situation of milk recording in dairy sheep

The table 1 summarizes the impact of milk recording in the countries having answered the on-line enquiry in 2010 and (or) 2011.

Table 1. Size of population of dairy sheep, impact of quantitative recording and recording designs in ICAR member countries.

Countries	Year	Size of population	Quantitative recording (official milk recording)		Methods used
			Number of recorded ewes	% recorded ewes	
Belgium	2010	1,919	488	25.4	AT
Canada	2011		531		
Croatia	2011	32,514	8,188	25.2	AT
Czech Rep.	2011	62,100[2]	853	1.4	AT (part), ET (part)
France	2011	1,395,000	300,473[1]	21.5	AC
Germany	2011	7,612	563	7.4	A4 (51%), AT (7%), E (42%)
Greece	2011	8,100,000[2]	92,360	1.1	A4
Italy	2011	5,687,000[2]	477,736	8.4	AT, AC
Portugal	2011	438,000[2]	20,926	4.8	A4
Slovak Rep.	2011	160,000[2]	10,827	6.8	AC
Slovenia	2011	4,950	4,234	85.5	AT
Spain	2011	3,200,000[2]	402,088	12.6	AT (88%), AC (11%), A4 (1%)
Sweden	2010-2011	10 to 15 flocks			

[1] in addition, 544,967 ewes are recorded with D method (non official milk recording) without qualitative recording

[2] figure from http://faostat.fao.org/

Official milk recording is carried out in every country and represents on the whole 1,319,267 ewes. D recording, which is a non-official and "free-of-rules" milk recording, is described only in France and is

implemented out of the nucleus scheme to help the breeder to optimize culling and replacement. D method represents 544,967 ewes on the whole. If we look at the countries with the largest dairy sheep population, situated in the Mediterranean area (Greece, Italy, Spain, France), the impact of milk recording is quite different: high in France (60.6% on the whole, 21.5% when considering only official milk recording), medium in Spain and Italy (respectively 12.6% and 6.4%), low in Greece (1.1%). Italy has the highest recorded population (477,736 ewes). Italy, France and Spain represent 89% of all sheep in official milk recording.

In the other countries, with smaller populations, milk recording represents few flocks and ewes, from 488 ewes in Belgium to 10,827 ewes in Slovak Republic. The other countries are (ordered by ascending number of recorded ewes): Canada, Germany, Czech Republic, Slovenia and Croatia.

The table 2 illustrates the increasing impact of official milk recording in most of the countries over the last 20 years. A key factor of this growth has been the steadily increasing adoption of simplified designs of official milk recording, such as AT or AC methods. Whereas in 1988, 2 countries only used simplified methods (France with AC method, Spain with AT method in Latxa breed), this number reached up to 6 countries in 1998, and 8 countries in 2009. The Working Group has enhanced simplified methods of milk recording since its creation in the late eighties, with the aim to compensate as far as possible the high cost of recording in small ruminants by reducing the number of measures. Nevertheless some countries with important dairy sheep population, such as Greece and Portugal, still use A4 method. In these countries, the impact of milk recording remains weak.

The additional tables, available on the ICAR website, show that five breeds are up to 100,000 recorded ewes (against 3 in 2010): Sarda and Valle del Belice (Italy), Lacaune (France), Manchega and Assaf in Spain. The Sarda breed has the more important population in official recording with roughly 240,000 recorded ewes, whereas the Lacaune breed has the more important population when including D method in the figures, with about 680,000 recorded ewes.

Table 2. Evolution of official milk recording over the last 20 years in ICAR member countries.

	1988			1998			2012		
	Recorded ewes (official)	%	Method	Recorded ewes (official)	%	Method	Recorded ewes (official)	%	Method
Italy	140,000	2.8	A4	331,024	5.0	A4	477,736	8.4	AT /AC
Spain	110,000	2.8	AT	141,044	6.2	AT	402,088	12.6	AT/AC/A4
France	202,000	16.8	AC	281,070	20.9	AC	300,473	21.5	AC
Greece	37,000	0.5	A4	26,600	0.3	A4	92,360	1.1	A4
Portugal	7,600	1.5	A4	38,571	15.2	A4/AT	20,926	4.8	A4
Slovak R.	-	-	-	5,100	2.3	A4/AC/AT	10,827	6.8	AC
Croatia	-	-	-	-	-	-	8,188	25.2	AT
Slovenia	-	-	-	1,474	19.8	A4	4,234	85.5	AT
Czech R.	-	-	-	177	35.0	AT	853		AT/ET
Germany	356	2.2	A4	836	3.3	A4/B4	563	7.4	A4/AT/E
Total	496,956			832,096			1,319,267		

3.2 Simplification of qualitative recording in dairy sheep

Conversely to dairy cattle, qualitative milk recording is optional in official milk recording in sheep, as established in the ICAR guidelines (ICAR guidelines, 2010), considering its high cost and considering that qualitative recording becomes useful and necessary only when selection on milk yield is efficient.

Moreover, simplified designs for sampling are strongly recommended to reach some cost-effectiveness. The main features of the table 3 can be summarized as following:

-The impact of qualitative recording among the recorded population is high only in countries with a quite small population (from 56% in Croatia to 100% in Czech Republic, Germany, Slovak Republic and Slovenia).

-Qualitative recording is not implemented in Greece and Portugal.

-In countries with a large population, the impact reaches 30% in Spain, 28% in France and 5% in Italy. Qualitative recording concerns only some breeds, some parities (lactation 1 or lactations 1 and 2). It is implemented within a simplified design of milk recording, with one sample per test-day (AC or AT methods).

Table 3. Qualitative recording in ICAR member countries.

Countries	Qualitative recording				
	Yes/ Not	Recorded ewes	% of the recorded ewes	Method used	Categories of ewes (lactation)
Belgium	No	-	-		
Croatia	Yes	4,646	56%	AT	
Czech Republic	Yes	853	100%	AT/E	
France	Yes	85,163	28%	Part-lactation sampling (AC)	Lacaune : L1/L2 Pyrenean breeds : L1
Germany	Yes	563	100%	A4/AT/E	
Greece	No	-	-		
Italy	Yes	22,061	5%	Part-lactation sampling (AC)	Sarda : L1
Portugal	No	-	-		
Slovak Republic	Yes	10,827	100%	AC	L1/L2/L3
Slovenia	Yes	4,234	100%	AT	
Spain	Yes	?	30%	AT,AC	

3.3 Breeding schemes, objective and selection criteria

Breeding programs based on progeny-test of rams by AI or by combining AI and controlled natural mating are implemented in a few breeds, in France, Italy and Spain (table 4). AI is not widespread (at the exception of France) and is mostly realized in fresh semen. 587,643 AI are realized in France, Italy and Spain, 85% of them in France. AI is practiced with a low dilution and with synchronization of the heats (one AI per ewe, whatever the result, returns being realized by natural mating). The selection criteria are still based on milk yield, with, sometimes, in addition, fat, protein and udder morphology. Somatic cell count (SCC) is taken into account only in the French Lacaune breed. In this breed, the selection criteria give the same weight on udder functional traits (SCC and udder morphology) and production traits.

Besides breeding programs set up with local breeds, some "foreign" breeds are more and more spread in more and more countries: East Friesian is mentioned as being recorded in Germany, Czech, Slovak, Croatia, Italy, Assaf in Spain, Lacaune in France, Spain, Italy, Germany, Czech, Slovak. East Friesian blood is present in cross breed or synthetic line (Assaf, Frizarta, improved Valachian, improved Bovec). In Spain, Assaf and Lacaune breeds represent 36% of all recorded ewes.

3.4 Other topics

Other additional tables (www.icar.org) present information about the following topics: definition of milk traits, milk recording equipment, molecular information in sheep and recording of other traits.

Table 4. Importance of breeding programs and selection criteria [1].

Country	Breed	AI progeny-tested rams	AI	Selection criteria [2]
France (2011)	Lacaune	531	406,027	(FY+PY+F%+P%) + .5 SCC + .5 Udder
	Manech Red face	150	61,181	FY+PY+F%+P%
	Manech Black face	30	7,979	FY+PY+F%+P%
	Basco-Béarnaise	50	15,018	FY+PY+F%+P%
	Corse	31	6,853	MY
Italy (2011)	Sarda	60	9,000	MY + Udder
Spain (2011)	Latxa blond faced	30	11,284	FY+PY+F%+P%+Udder
	Latxa black faced	42	14,828	FY+PY+F%+P%+ Udder
	Karrantzana	2	197	FY+PY+F%+P%+ Udder
	Manchega	232	33,195	MY+Udder
	Castellana	4	766	MY
	Churra	50	9,975	FY+PY+F%+P%+ Udder
	Lacaune		4,692	
	Assaf	60	6,648	

[1] MY=milk yield, FY=fat yield, PY=protein yield, F%=fat content, P%=protein content, SCC=somatic cell count, Udder=udder morphology

[2] most of the breeding schemes include selection for scrapie resistance (PrP gene)

4.0 Conclusion

The top issues of the newly named Performance Recording of Dairy Sheep are: to enhance members' interest to the yearly enquiry in order to have an up-to-date situation of recording in dairy sheep in ICAR members countries; to finalize the on-going amendments of the guidelines about quality assurance for AC recording and udder morphology recording; to encourage the group to participate more actively to the sessions; to open new fields allowing to provide information and services which may help member organizations to develop or make more profitable their activities. In this respect, new developments in tools and methods are of high interest, even for sheep dairying: assessment of genomic selection, especially in France, Italy and Spain, but also utilization of on-farm automated recording devices, or possibly portable automated devices that might provide very useful data for genetic, flock management, quality of the milking.

5.0 References

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