



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Section 16 – Guidelines for Performance Recording in Dairy Sheep and Dairy Goats

Section 16 – Dairy Sheep and Goats
Version February, 2018

Network. Guidelines. Certification.

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Change Summary

Date of Change	Nature of Change
July 2017	Moved from Section 2.2 and 2.3 to Section 16 covering just Sheep and Goats.
July 2017	Reformatted using new template.
July 2017	Table of contents added.
July 2017	Heading numbers and heading text edited for clarity and removal of redundant text.
July 2017	Appendices from old section 2 moved into this document and renumbered as Annexes 1 to 3. References to these in text also updated.
August 2017	Stopped Track change sand accepted all previous changes.
August 2017	Moved the file to the new template (v2017_08_29).
October 2017	Updated version to October. Edited names of annexes to make it clear they apply to sheep.
October 2017	Hyperlinks checked and corrected
November 2017	Changes as proposed by Sheep Goat and Small Camelid Working Group incorporated and marked with track changes.

Date of Change	Nature of Change
November 2017	Correction to section 2.5.1 to provide reference to methods for computing 24 hour yields.
February 2018	On Saturday 10th February, changes approved by the ICAR General Assembly in Auckland, New Zealand.

1 Dairy Sheep

The aim of this section is to provide definitions, guidelines and standards on performance recording in dairy sheep.

The guidelines have been set up for the first time in 1992 with the purpose of being informative more than normative. They have been regularly updated since then. The reader must have in mind the following considerations to clearly understand the principle of the guidelines.

Unlike the simple situation of exclusively milking soon after calving which predominates in dairy cattle, the dairy sheep systems are much more varied and complicated. In most cases, normal husbandry systems include a suckling (or suckling plus milking) period of at least one month. These variations in systems play a major role in determining the difference in milk recording methods and lactation calculation used for sheep.

Moreover, the impact of milk recording is weak in dairy sheep, even more for qualitative recording, due to its high cost. Therefore, simplified methods such as AT and AC designs are strongly promoted and official milk recording with a purpose of collective valorization should be concentrated in farmers involved in breeding schemes. For commercial flocks within this pyramidal management of the population, a very simplified non official recording called D method, designed only for technical and economic development within a flock, has been proposed.

To meet specific situations in which basic rules of milk recording might not be respected, alternative official milk recording are described, such as E recording or alteration of AC recording.

Finally, as functional and health traits are of growing interest, the last updates in 2014 include udder morphology recording.

1.1 Terminology and Traits

1.1.1 Terminology

The following terms are used to describe all dairy sheep breeding systems covered:

- a. **Suckling length** corresponds to the suckling period of lambs or the simultaneous suckling and milking period. If the lambs only suckle during the colostral phase, the suckling length is considered to be zero. If there is an initial suckling phase, milk yield during this suckling period is equal either to the milk suckled, if suckling only, or to the milk suckled plus that milked, should there be partial milking during the suckling period.

- b. **Milking-only length** corresponds to the period during which the ewe is milked, starting when the lamb(s) has (have) been weaned, and until drying off.
- c. **Lactation length** is equal to the sum of the suckling length plus milking-only length; it is also the difference in days between the date of lambing and the date of drying off.
- d. **Total milk yield (TMY)** is the milk yield produced from lambing to drying off for a ewe with no suckling period.
- e. **Total milked milk (TMM)** is the milk yield produced during the milking only period, in the case of lactation with milking only after a suckling period.
- f. **Total suckled and milked milk (TSMM)** is the sum of the milk yield of the suckling period (milk suckled, or milk suckled plus that milked) plus the TMM.
- g. **Milk recorded yield:** only the milk yield during exclusive milking can be a part of milk recording on farms. If the suckling period is not of zero length, the milk yield in dairy sheep only takes into account exclusive milking and the length of the milking-only period (which starts once the lambs are fully weaned and is over when the ewe dries off) : it corresponds to the TMM.

The following situations therefore arises:

1.1.2 Milking from lambing

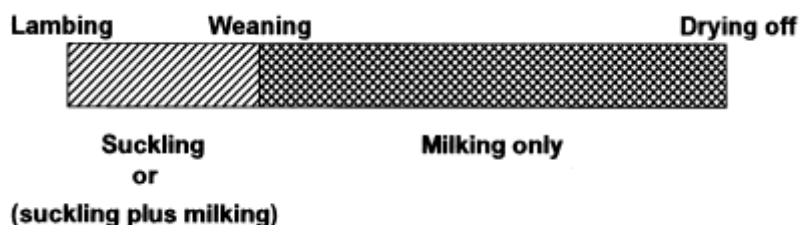
The ewes are milked after lambing (once the colostral phase is over), as is usually the case with dairy cattle.



The lactation length and the length of the milking-only period are thus equal (not counting the colostral phase). Milk yield during exclusive milking equals the total milk yield during lactation (TMY).

1.1.3 Milking after a suckling period

The ewes are milked after a suckling period for the lambs or after a combined suckling plus milking period.



Milk yield during the milking-only period (TMM) is therefore smaller than total milk yield during lactation (TSMM); only the downward phase of the lactation curve is recorded in almost all cases, and the lactation peak falls within the initial suckling (or suckling plus partial milking) period. The length of the milking-only period equals the lactation length minus the suckling length.

Through the incorrect use of language, we often speak broadly of lactation calculations, whereas here it is used specifically for the milk yield calculation using the milking-only period (TMM).

1.1.4 Total milk yield and production of reference

Either the total milk yield per lactation (TMY or TSMM) or the milk yield during the milking-only period (TMM) is calculated, according to whether mechanical/by hand milking starts from lambing, or whether it starts after a suckling period. Because breeding systems may differ significantly between area and breed, it is impossible to define a standard lactation length or a standard milking length (of the milking-only period). We therefore recommend that the approved organisation defines, for each breed and category of ewes (by age or lactation number), a reference production per lactation, or a reference production for the milking-only period, according to the breeding system. The chosen standard length (in days) must be declared in the publication of the results.

1.2 Rules and standards

This chapter describes all the standards applicable in all cases for official methods A, B, C or E milk recording for sheep.

1.2.1 Responsibility and type of recording

The recording operations described below are carried out by a State employee or an employee of an officially registered organisation (the milk recording itself being undertaken by an official tester of the organisation in method A; by the farmer or his employee in method B; by the official tester and/or the farmer in methods C and E):

- a. Identification of animals by conventional or RFID devices on the basis of the official national system.
- b. Recording of information on mating, artificial insemination, lambing, milk recording (ewe and flock), and inventories in the flocks of owner-breeders.
- c. Checking records and making periodic visits to the sheep farms: organisation of controlled mating (optional), keeping of lambing records; marking of lambs at birth; checking on sire and dam assignment based on the average length of gestation and its standard deviation (i.e. an average gestation period of x days, plus or minus y days). The values of x and y must be provided for each breed or group of breeds concerned in each country.

Whatever the recording method - A, B, C or E - used for milk recording, certain information is provided by the breeder himself, such as mating and lambing information (in the case of controlled mating). Breeders are subject to a supervisory system that must be operated by a recognised recording organisation. For instance, in this case, it may be a check on pedigree by blood group or DNA testing. Any information produced directly by the breeders (rather than an official recorder) must be subject to the supervisory procedure described by the recognised recording organisation.

1.2.2 Ewes to be controlled

1.2.2.1 Case of the methods A, B, C

The breeder may split his flock into one or several flocks for management purposes. If the breeder is managing several flocks, he may record only one of his flocks, on the condition that he agrees to always breed the recorded flock separately from his other non-recorded flock(s),

which can be considered to be commercial flocks. Similarly, if only one of the flocks of the breeder is recorded, mixing the ewes of a non-recorded flock with the ewes of the recorded flock during the milking period is not permissible.

An inventory of those ewes on the recorded flock(s) that belong to the breeder in question is kept throughout the milk recording operation, from the beginning to the end of milking.

Whenever there is (quantitative) milk recording for the recorded flock, all the ewes being exclusively milked (of the breeds or genotypes involved in the breeding program) must be recorded; the principle of complete recording is essential to avoid sampling biases. Ewes suckled, or suckled and partially milked, during the suckling phase (see Terminology on page 4) must not be included, as it is impossible to measure the individual milk yield of suckled ewes, or suckled and partially milked ewes, simply and accurately (an essential condition for the large-scale application of milk recording on sheep farms). Consequently, only milk recording carried out when the ewe is definitively separated from its lamb(s) i.e. only when being milked exclusively, can be taken into account.

In addition, if dairy ewes belonging to another farmer are being kept for part of the year at the farm where milk is being officially recorded, they must not be included in the official recording for that farm. This is why it is essential that all ewes belonging to a breeder who applies method A or B or C milk recording for his flock(s) must be included in an up-to-date and accurate inventory.

1.2.2.2 Case of the method E

Method E is a flexible official method applied when the breeding purpose is to maintain the breed with all the typical standard performance signs (flocks without milk production and/or flocks with only a fraction of the ewes belonging to the flock-book). In the first case, the rule of not recording suckling ewes may not be respected (the lambs must be removed at least 12 hours before the test-day). In the second case, the rule of recording all the animals of the flock may not be respected (only designated ewes or designated lactations are recorded). A comprehensive description of method E is available in the minutes of the meeting of the Working Group on Milk Recording of Sheep, held in Interlaken on 28 May 2002 (on the web at: <https://www.icar.org/index.php/technical-bodies/working-groups/sheep-goats-and-small-camelids-working-group/survey-on-sheep-milk-recording-2002>)

1.2.3 First test-day

1.2.3.1 For the flock

The first test-day of the flock takes place four to 15 days after the beginning of mechanical/hand-milking only in the flock. This recommendation is suitable for the practical organisation of tests on the basis of a monthly recording interval.

1.2.3.2 For a ewe

The first milk recording of a ewe must take place within the 35 days following complete separation from its lambs (method E excepted), with a tolerance of 17 days to take into account the starting of milking only by batch and fluctuations in the periodicity of milk recorders' visits. Consequently, the difference between lambing and the first (quantitative) milk recording of a ewe is at most equal to the average suckling length of the breed in question plus 52 days (35 + 17). If this difference is greater than the threshold described above, there should be no lactation calculation for the ewe in question. For example, for breeds whose average suckling period lasts 0 days (colostral phase only), 25 days or 45 days,

the first quantitative milk recording of each ewe must take place less than 52, 77 or 97 days, respectively, after lambing.

1.2.4 Frequency and number of milk recording visits

1.2.4.1 For the flock

In the case of record of the two daily milkings, the average recording interval (days) between two successive milk recording for a flock is monthly (30 days, with a range from 28 to 34 days) for the A4, B4, C4 or E4 methods, and it can reach, respectively, 36 and 42 days for the A5, B5 or C5, and A6, B6 or C6 methods. If only one daily milking is recorded (AT, BT, CT, AC, BC, CC, EC or ET methods), the average recording interval is monthly (30 days), as for the A4 method (considered as the standard method). There is no minimum interval, so supplementary testing can be carried out when necessary, due to the way the lambing is spread out (e.g. a fortnight to three weeks between two successive tests, so as to cover the start of milking of ewe lambs and taking into account the interval between the adult ewe tests).

There is no fixed number of monthly recordings per flock and per milk period: it must, therefore, be decided upon by each official organisation, as must clauses on the maximum interval (in days) between the first and last (quantitative) milk tests on the flock within a milking operation.

1.2.4.2 For a ewe



The maximum interval between two successive non-zero tests on the same ewe is 70 days (2 x 35 days). There is, therefore, a tolerance of one missed test on the basis of a monthly test. If the interval between two tests (i) and (i+1) is greater than the maximum, the lactation calculation for the ewe being tested is stopped at the test (i).

The minimum number of valid monthly tests (milk not zero) per ewe needed for the lactation calculation is not set; it must, therefore, be described for each breed and category of ewe considered (first lactation, second and more).

1.2.5 Type and expression of milk recording

The only obligatory milk recording is that of the quantity of milk (i.e. volume/weight recording). Tests on the chemical composition of the milk or qualitative tests are optional (see Guidelines on optional records on page 11). Quantitative recording concerns the quantity of milk supplied by the ewe when milked in the usual conditions on the farm, whether milked by hand or by machine. Should milking be mechanical, it is recommended that the volume of individual milk collected during hand or machine stripping is not taken into account, in order to favor indirect selection as regards adaptability to machine milking.

If, nevertheless, the (hand or machine) stripping yield is recorded, it is necessary to mention it in the presentation of the results.

Milk is measured at the two daily milkings (methods A4, B4, C4 or E4; methods A5, B5 or C5; methods A6, B6 or C6). However, this measurement may only be applied at one of the two

daily milkings; in this case, either the strict alternating monthly test is applied (methods AT, BT, CT or ET) or the corrected monthly test for evening/morning differences, taking into account the total volume of milk produced by the whole flock over the two milkings concerned (methods AC, BC, CC or EC).

Milk may be measured by weight (grams) or volume (millilitres). It is acceptable to take volumetric measurements, as they are usually quicker and can be as accurate as weighing (if milk meter measurements are independent of froth). The conversion factor of weight (grams) into volume (millilitres) is 1.036 (normal sheep milk density). The minimum daily quantity tested is set at 200 g or 200 ml. The limit of error (standard deviation of error) is 40 g or 40 ml.

ICAR approval for dairy sheep equipment has been available since 1995. The devices approved for sheep are listed in [here on the ICAR website](#). In the meantime, milk may be weighed or measured by means of a device approved by the organisation using it before 1 January 1995, and, if possible, checked by an appropriate government agency.

1.2.6 Lactation calculation clauses

1.2.6.1 For the flock

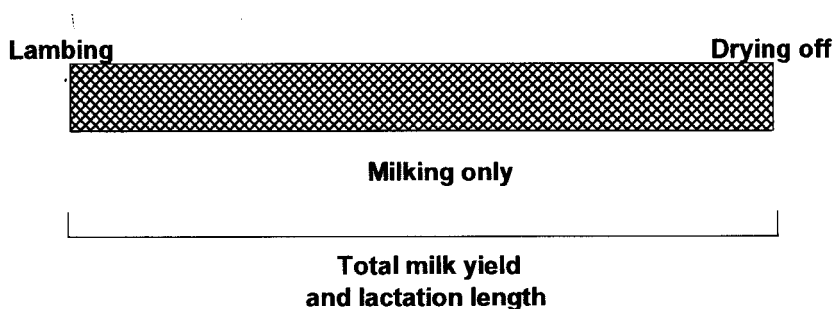
A farmer must adopt a single test method for a given milk period: method A (A4 or A5 or A6 or AC or AT); method B (B4 or B5 or B6 or BC or BT); method C (C4 or C5 or C6 or CC or CT); or method E (E4 or EC or ET).

1.2.6.2 For a ewe

When milked from lambing, total milk yield per lactation (TMY) is calculated using the Fleischmann method (or another method, if proved to be of equivalent accuracy). When milked only after a suckling period, milk yield during exclusive milking (TMM) is also calculated using the Fleischmann method (or another method, if proved to be of equivalent accuracy), basic measurements only concerning the yield from milking after the lambs have been fully weaned (in method E, as an exception, total suckled and milked milk (TSMM) may be calculated).

Calculations may be based on the real weaning and drying off dates. They may also be based on dates calculated on the basis of standard lengths for the suckling period, and the interval between the last non-zero milk recording and drying off. The whole calculation procedure is defined by each country and/or breed, in which case it is necessary for the calculation clauses to be accurately described when the results are presented (see Presentation of results on page 20).

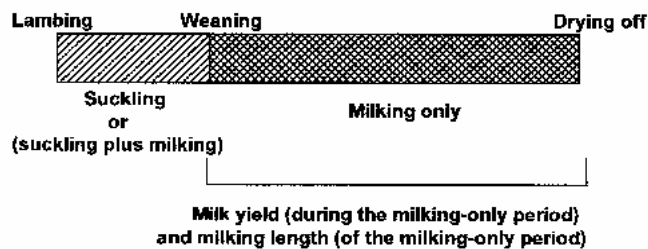
Milking from lambing



The total milk yield per lactation (TMY) is calculated (as for cattle), together with the corresponding lactation length [difference between the drying off date and the lambing date]. The lambing date is the real date. The drying off date is either real or calculated. There may or may not be a minimum number of tests per ewe before applying the Fleischmann method of calculation. The calculation procedure is described by the organisation responsible for its implementation.

Milking after a suckling period

Milking after a suckling period



The milk yield during the milking-only period (TMM) and the corresponding length of the milking period (difference between the drying off date and the weaning date) are both calculated. The lambing date is the real date. The weaning date is either real or calculated (standard suckling length). The drying off date is also either real or calculated. There may or may not be a minimum number of tests per ewe before applying the Fleischmann method of calculation. The calculation procedure is described by the organisation responsible for its implementation.

1.2.7 Quality assurance regarding AC method

This section has been constructed to solve specific problems relating to the AC method. However, the described procedure may also be applied to the BC, CC, and EC methods and also relates to the AT, BT, CT and ET methods.

The AC method requires the total amount of milk the flock produced over 24 hours to calculate the AC coefficient applicable to each ewe recorded at the recorded milking, in order to obtain a daily production total. The following situations, in which the AC method procedures cannot be applied without producing biases, have been identified:

- a. Flocks where a part is registered and therefore recorded, whereas the bulk milk is that of the whole flock. This is particularly frequent in countries/breeds where the milk recording practice is laborious and can be supported by the farmer only for a part of the whole flock. In some situations, permitting farmers to record only a portion of their flock should result in more recorded flocks (due to the fact that farmers of some large flocks would adhere to milk recording if they are allowed to record only a part of the flock). This strategy contributes to an increase in the cost-effectiveness of milk recording, by distributing the costs related to visiting one flock among a larger number of recorded ewes, and also to an increase in genetic progress.
- b. Flocks where a portion of the ewes is milked once a day, whereas the other portion is milked twice a day. Once-a-day milking is becoming more and more frequent in some production systems, in order to reduce labour; for example, to save time for domestic cheese-making, as well as to reduce energy costs. Once-a-day milking may occur at

the end of the lactation period (early summer) only for ewes that lambed in autumn, whereas ewes that lambed later are still milked twice a day.

Although, according to the guidelines, such practices should not occur, a procedure of quality assurance is proposed both to control and elaborate on an alternative AC coefficient. The main features of the procedure are described below; the entire procedure being available in a document produced at the ICAR meeting held in Cork on 29 May 2012 and available [here](#) on the ICAR website. Basically, this procedure introduces 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 result in 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.

Nevertheless, before setting up the procedure of quality assurance, which may be costly, and to avoid it if possible, it is strongly recommended that the breeder separates the ewes not registered beforehand, or, in the case of systems with ewes milked once a day, either to separate the ewes milked once, or to identify them. Such practices should enable the application of the AC coefficient only for appropriate ewes.

Applying the procedure of quality assurance is optional. It is up to the organisation to decide to apply it, as far as the situation requires it. The procedure solves the problem of milk yield, but not the problem of samples.

1.3 Guidelines on optional records

This chapter describes:

- a. Optional records that can be kept within the framework of official methods A, B, C or E.
- b. Method D, which is a non-official method of milk recording.

1.3.1 Qualitative tests on the milk's chemical composition in official methods A, B, C or E

Given that it is expensive and often technically difficult to administer in large flocks, testing milk's chemical composition, which entails taking representative samples in order to analyse fat and protein content, is optional.

Such a qualitative test may be implemented either for experimental purposes or within the framework of integrated selection schemes, which are already very efficient as regards milk quantity on the scale of the recorded population. In the second case, the qualitative test must be part of the flock's monthly quantitative recording (A4, B4, C4 or E4, AC, BC, CC, EC, AT, BT, CT, ET) or approximately monthly quantitative recording (A5, B5 or C5, A6, B6 or C6), whether carried out each month or only in certain months. Furthermore, an attempt should be made to sample all or most ewes in one or more categories or classes of age found to be present during the corresponding quantitative tests, in order to avoid sampling bias.

The qualitative test procedure is described by each officially recognised organisation: objectives of the qualitative test (experimental or for selection purposes); frequency of testing; sampling procedure; categories of ewes sampled and percentage, with respect to those ewes whose milk quantity is recorded; supervisory procedures followed (for the samples taken and milk analysis laboratories); type of chemical analysis and calculations made.

Analysis for protein content (or nitrogen content) and fat content must be carried out on the same reference sample of the recorded milkings. The equipment used for determining fat and

protein content should be submitted to periodic checking, in accordance with suitable standards approved by ICAR.

1.3.2 Recording of udder morphology

Within the functional traits in which interest is growing, with the global purpose of reducing the costs of production, those relating to udder health and udder morphology are becoming increasingly documented. 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 involved.

This chapter aims to:

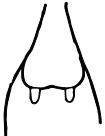

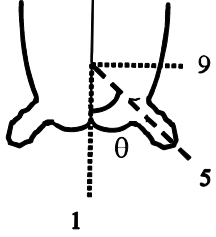
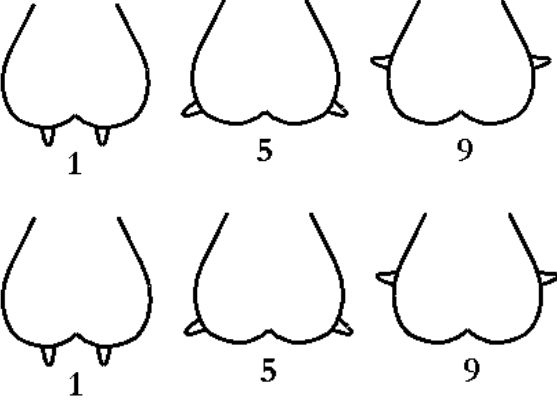
- a. Propose different traits that may be scored, according to the specificity of each breed.
- b. List references for genetic parameters, especially around the relationship between milk traits and udder traits. No recommendation is made because there is, at this stage, no requirement for rationalisation.

This chapter uses results presented at the workshop 'Udder Recording Comparison between Teams', which was held in Leon, Spain (27-29 May 2002), in the framework of the EU contract QLK5-2000-00656 project called 'Genesheepsafety'.

As in cattle ([Section 5](#) 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:

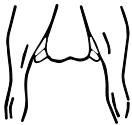
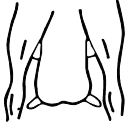
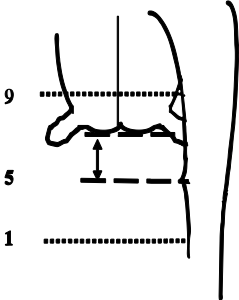
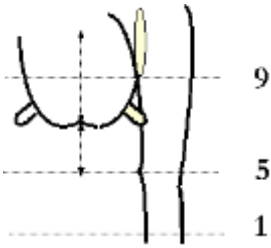
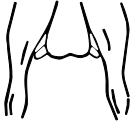

1. Teat position
2. Udder depth
3. Udder attachment
4. Udder cleft
5. Teat size

1. Teat position


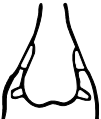
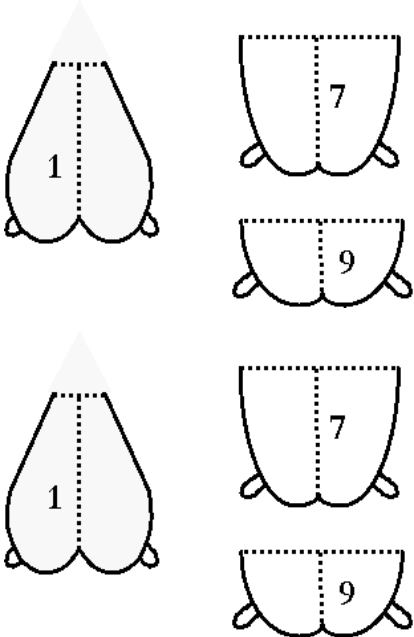
Spanish Churra	Vertical = 9 	Horizontal = 1 
What is scored?	Teat placement	
French Lacaune	Vertical = 1 Horizontal = 9 	
What is scored?	Right teat angle	
Italian Sarda	At the bottom and vertical = 1 Lateral at the lower part = 5 Lateral at the higher part = 9 	

What is scored?	Udder cistern height
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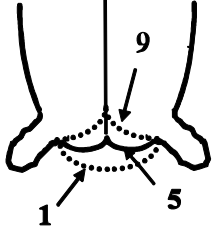
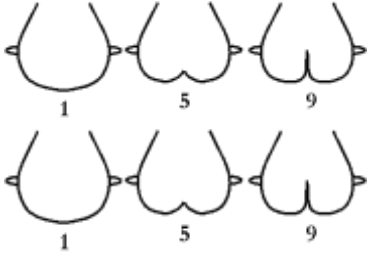
2. Udder depth

Spanish Churra	Shallow = 1 	Deep = 9 
What is scored?	Udder depth respect to abdomen basis	
French Lacaune	Deep = 1 Shallow = 9	
What is scored?	Distance between udder floor and hock	
Italian Sarda	Deep = 1 Shallow = 9	
What is scored?	Distance between udder cleft and hock	
Israeli Afec Assaf	Shallow = 1 	Deep = 9 
What is scored?	Udder depth respect to abdomen basis	



3. Udder attachment

Spanish Churra	Wide = 9 	Weak = 1 
What is scored?	Perimeter of insertion to the abdominal wall	
Italian Sarda	<p>Width larger than height = 9</p> <p>Width equals height = 7</p> <p>Width smaller than height = 1</p> 	
What is scored?	Ratio: udder height/attachment width	

4. Udder cleft

French Lacaune	Missing = 1 Well marked = 9 <div style="text-align: center;">  </div>
What is scored?	Furrow
Italian Sarda	Missing = 1 Average = 5 Well marked = 9 <div style="text-align: center;">  </div>
What is scored?	Udder separation

5. Teat size

Spanish Churra	Short = 1 <div style="text-align: center;">  </div>	Long = 9 <div style="text-align: center;">  </div>
What is scored?	Teat size	

The traits described above and the corresponding tables (list of traits included in udder appraisal) might be updated by either other breeds/countries implementing udder

morphology recording, or by the above breeds/countries, if their traits or table evolve. Please advise the chairman of the working group on dairy sheep of any updates to the list of traits/tables.

References to the genetic parameters of the traits estimated in the various countries and used in the above tables were obtained from the following papers:

- Barillet F., Astruc J.M., Lagriffoul G., 2007. Taking into account functional traits in dairy sheep breeding programs through the French example. EAAP publication No.121, 2007. Proceedings of the 35th Biennial Session of ICAR, 6-10 June 2006, Kuopio, Finland.
- Casu Sara, Pernazza I., and Carta A., 2006. Feasibility of a linear scoring method of udder morphology for the selection scheme of Sardinian sheep. *J. Dairy Sci.* 89:2200-2209.
- Fernandez G., Baro J.A., de la Fuente L.F., San Primitivo F., 1997. Genetic parameters for linear udder traits for dairy ewes. *J. Dairy Sci.* 80, 601-605.
- Gootwine E., Alef B., Gadeesh S., 1980. Udder conformation and its heritability in the Assaf (Awassi x East Friesian) cross of dairy sheep in Israel. *Ann. Génét. Séle. Anim.* 1980, 12 (1), 9-13.
- Marie-Etancelin C., Astruc J.M., Porte D., Larroque H., Robert-Granié C., 2005. Multiple-trait genetic parameters and genetic evaluation of udder-type traits in Lacaune dairy ewes. *Livestock Production Science* 97 (2005) 211-218.

1.3.3 Other types of testing in official method A, B, C or E

Following on from qualitative milking recording, other possibilities include somatic cell count, mastitis and, similar to other milk characteristics, the possibility of measuring machine milking ability via milk flows that can be recorded using automated sheep milk recording systems. Prior to milk recording, reproductive traits can also be recorded; these include information on the reproduction method used (artificial insemination following induced oestrus, induced oestrus and hand mating, or natural mating etc.), the number and sex of lambs born, the open day-time from lambing to conception etc.

Procedures for such optional measurements are described by the officially recognised organisations responsible for their implementation.

1.3.4 Method D

Method D is defined as a simplified, non-official recording, based on two to four recordings per flock and per year with the aim of getting two to three test-days per ewe in the middle of the lactation. The record may be realised either on one of the daily milkings on all the ewes being exclusively milked at the test-day, or on all the daily milkings on all the ewes being exclusively milked at the test-day. Of course, it is recommended to record only one of the daily milkings, since it is a very simplified method. In this case, the test-day may be adjusted in order to get a daily milk (for instance by multiplying it by two or by any other coefficient, taking into account the morning/evening difference).

The purpose is to implement a within-flock ranking of the ewes (either an individual ranking or a ranking in sub-parts of the flock to manage replacement and culling. The ranking may be based on such criteria as the average test-day or lactation calculation, which may or may not be corrected for variation factors such as lactation number, age, or month of lambing. Nevertheless, in such a simplified design, lactation calculation is not recommended, even though possible, given the low number of test-days per ewe. Thus method D may be useful in two types of situations:

- a. It may be applied to commercial flocks out of the well-established nucleus of a pyramid breeding scheme.
- b. In developing countries, in order to provide advice to farmers on feeding, health, breeding and, if possible, on genetics. In this situation, it could be the first step to the implementation of an official recording for genetic purposes.

Whatever the situation, method D does not meet the requirements for the ICAR Certificate of Quality.

1.4 Presentation of results

This paragraph concerns the methods A, B, C and E.

To facilitate the presentation, the following vocabulary is used for milk yield calculations:

- a. Total milked yield/total milked milk
- b. Milking length.

Milk yield equals:

Total milk yield per lactation (TMY) in the case of milking from lambing or;

Milk yield during the milking-only period (TMM), in the case of milking after a suckling period.

Milking length equals:

Lactation length in the case of milking from lambing, or length of the milking-only period, in the case of milking after a suckling period.

1.4.1 Obligatory results

It is obligatory to provide the following results for a given breed and a given year or milk period:

1.4.1.1 Information on the milk recording and calculation methods

- a. Organisations responsible for the milk recording.
- b. Method of quantitative recording used: methods A4, B4, C4 or E4 , A5, B5 or C5 , A6, B6 or C6, AT, BT, CT, ET, AC, BC, CC or EC.
- c. Unit of measurement used for milk quantity: litres or kilos.
- d. Type of milk recording equipment (milk meter...) used: to be described.
- e. Organisation responsible for the lactation calculation.
- f. Drying off date: real or calculated; specify the procedure if calculated or describe whatever rule is applied to determine the end of the milking period.
- g. Lamb weaning date (should there have been a suckling period): real or calculated; indicate the average length of suckling used, should this date be calculated.
- h. Minimum number of milk recording tests per ewe to calculate milk yield.
- i. Calculation of milk yield: based on the real length of milking or a standard length to be described.

- j. Published milking length: provide the calculation formula [difference between dates used].
- k. Existence of adjustments for milk yield or not: type and description (example of adjustments for age, lambing period etc.).
- l. Existence of supervisory systems or not: type and description.

1.4.1.2 Information on the flocks subject to official method A, B, C or E milk recording

- a. Number of farms subject to official milk recording (year).
- b. Number of ewes on these farms (inventory at lambing).
- c. Number of lactating ewes on these farms (calculated milk yield).
- d. What breeding system is used as regards lactation calculation?

System 1: milking from lambing

System 2: milking after a suckling period

- a. If system 2: average length of the suckling period (in days) and detailed description of the initial suckling or suckling plus milking phase.
- b. Description of reproduction objectives: achievement of one or more lambings per milking period; age at first lambing.
- c. Type of milking: machine (% of farms and ewes subject to official recording) or by hand (% of farms and ewes subject to official recording).
- d. Results of milk recording: total milked yield and length of milking (cf. box above); average daily milk yield (total milked yield divided by the milking length). If possible, the milk yield results should be presented for all lactations and according to lactation number. Furthermore, raw milk results should be provided, with no adjustment for factors of variations.

1.4.1.3 Information on the ewes

The following information must be provided for each lactation whose obligatory results are published:

- a. The ewe's ID
- b. Age at lambing
- c. Lactation number or category of age (to be described)
- d. In the case of suckling, the real or standard suckling length
- e. Milk yield (without adjustment): TMY or TMM
- f. Milking length
- g. Average daily milk yield

The following results may also be published:

- a. Difference (in days) between the lambing date and the date of the first test-day
- b. Maximum milk recording test (with the lactation stage)
- c. Total number of monthly milk tests realised for this ewe

- d. A production of reference (and the chosen standard length)

1.4.2 Publication of results of optional recording

1.4.2.1 Information on the implementation of qualitative milk recording

The following relates to methods A, B, C or E (1.3.1, 1.3.2 and 1.3.3) and method D (1.3.4):

- a. Objectives of the qualitative testing: experimentation or selection.
- b. Description of the sampling procedure used.
- c. Test methodology used: milkings tested, test frequency, categories of ewes sampled.
- d. Results: percentage of ewes sampled in relation to the ewes tested for milk quantity (for the same category of females).
- e. Analyses: types of milk analyses, methods and units of measurement used for results.
- f. Calculations made: description of the type of calculations and results published.
- g. Presentation of mean results: breed, flock and ewe.
- h. Existence of supervisory systems or not: type and description.

1.4.2.2 Reproduction results

- a. General description of breeding system distinguishing two main systems: one lambing per year or aiming to have several lambings per year
- b. Description of reproduction methods used (and their frequency for farms subject to milk recording): induced oestrus and artificial insemination, induced oestrus and hand mating, natural mating. Open day-time from lambing to conception.
- c. Results of average age at first lambing, depending on the reproduction method
- d. Description of lambing periods (frequency) per age group and reproduction method
- e. Average fertility results per age group and reproduction method
- f. Average prolificity results per age group and reproduction method.

1.4.2.3 Other optional results

These results can be provided for the breed, flock, ewe or region. The following information is an example of such optional results:

- a. Results of weighing lambs at birth or on weaning
- b. Results of weighing ewes at parturition or lambing
- c. Causes for reform in the framework of milk recording
- d. Frequency of mastitis etc. ...

1.4.2.4 Method D

Precise description of method D used as a simplified design:

- a. Design (number of recordings per flock and year);
- b. Calculations and type of ranking set up.

Whatever the design, calculation and type of ranking, method D does not meet the requirements for the ICAR Certificate of Quality.

2 Milk recording in goats

The purpose of the present standards and guidelines is to provide results which can be applied for integrated selection schemes and for international exchange of animals and information.

2.1 Definitions of milk traits

2.1.1 Terminology

The following terms will be used to describe the possible livestock breeding systems:

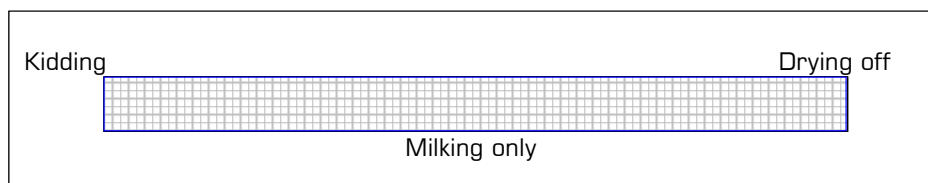
- a. The suckling length corresponds to the suckling period of kids or the simultaneous suckling and milking period. If the kids only suckle during the colostral phase, the suckling length is considered to be zero. If there is an initial suckling phase, milk yield during this suckling period is equal either to the milk suckled if suckling only, or to the milk suckled plus that milked should there be partial milking during the suckling period.
- b. The milking-only length corresponds to the period during which the goat is milked starting when the kid(s) has (have) been weaned and until drying off.
- c. The lactation length is equal to the sum of the suckling length plus milking-only length: it is also the difference in days between the date of kidding and the date of drying off.
- d. The total milk yield per lactation (TMY) is the milk yield produced in the case of lactation with milking from kidding (without suckling period).
- e. The total milked milk (TMM) is the milk yield produced during the milking only period, in the case of lactation with milking only after a suckling period.
- f. The total suckled and milked milk (TSMM) is the sum of the milk yield of the suckling period (milk suckled, or milk suckled plus that milked) plus the TMM.

Only the milk yield during exclusive milking can be a part of milk recording on farms. If the suckling period is not of zero length, the milk yield in dairy goat only takes into account exclusive milking and the length of the milking-only period (which starts once the kids are fully weaned and is over when the goat dries off): it corresponds to the TMM.

The following situations therefore arise:

2.1.2 Milking from kidding

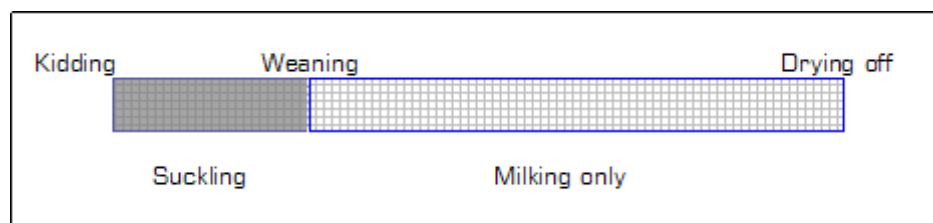
The goats are milked after kidding (once the colostral phase is over) as is usually the case with dairy cattle.



The lactation length and the length of the milking-only period are thus equal (not counting the colostral phase). Milk yield during exclusive milking equals the total milk yield during lactation (TMY).

2.1.3 Milking after a suckling period

The goats are milked after a suckling period for the kids or after a combined suckling plus milking period.



Milk yield during the milking-only period (TMM) is therefore smaller than total milk yield during lactation (TSMM): only the downward phase of the lactation curve is recorded in almost all cases, and the lactation peak falls within the initial suckling (or suckling plus partial milking) period. The length of the milking-only period equals the lactation length minus the suckling length.

Through the incorrect use of language, we often speak broadly of lactation calculations, whereas here it is strictly used for the milk yield calculation using the milking only period (TMM).

2.1.4 Total milk yield and production of reference

The breeding systems may differ very much from region (breed) to region (breed), therefore it is not possible to define a standard lactation length or a standard milking length (of the milking-only period): we therefore recommend that the approved organization define, for each breed and category of goats (age or lactation number), a reference production per lactation or a reference production for the milking-only period, according to the breeding system. The chosen standard length (in days) must be declared in the publication of the results.

2.2 Responsibility and type of recording

The various recording operations described below are carried out by an employee of an officially registered organization (the milk recording itself being undertaken by an official tester of the organization in the method A, and by the farmer or his employee in the method B, by the official tester and/or the farmer in the methods C and E):

- a. Identification of animals by conventional or RFID devices on the basis of a national system providing a unique number for the animals. The identification of the kids has to be done within a maximum of 30 days from birth. It is only necessary to identify those kids which are kept for breeding purposes.
- b. Recording of information on mating and artificial insemination (in the case of recorded mating), and kidding, milk recording (goat and flock), keeping of goat and buck inventories on the flocks of owner-breeders.
- c. Checking of the records and periodic visits of the goat farms: organization of controlled mating (optional), keeping of kidding records, marking of kids, checking on maternal/paternal filiations based on the average length of gestation and its standard deviation (i.e. an average gestation period of x days plus or minus y days). The values of x and y must be provided for each breed or group of breeds concerned in each country.

Whatever the method A, B, C, or E used for milk recording, certain information is provided by the breeder himself, such as mating and kidding information (in the case of controlled mating): they are subject to a supervisory system which has to be effected a recognized recording organization: for instance, in this case it may be a check on pedigree by DNA analysis. Any information produced directly by the breeders (rather than an official recorder) must be subject to the supervisory procedure described by the recognized recording organization.

2.3 Goats to be controlled

2.3.1 Case of the methods A, B, C

The breeder may split his flock into one or several flocks. If the breeder is managing several flocks, he may record only one of his flocks, on condition that he agrees to breed the recorded flock, always separately from his other non-recorded flock(s) which can be considered as commercial flocks.

Likewise, if only one of the flocks of the breeder is recorded, it is forbidden to mix goats of a non recorded flock with the goats of the recorded flock, during the milk period.

An inventory of those goats on the recorded flock(s) which belong to the breeder in question is kept throughout the milk recording operation from the beginning to the end of milking. Whenever there is (quantitative) milk recording for the recorded flock, all the goats being exclusively milked (of the breeds or genotypes involved in the breeding program) must be recorded: the principle of an exclusive record is essential to avoid sampling biases. Goats suckling or suckling with partial milking during the suckling phase (see Terminology on page 23) must not be included: it is impossible to measure the individual milk yield of suckled goats or suckled and partially milked goats simply and accurately (essential conditions for the large-scale application of milk recording on farms). Consequently, only milk recording carried out when the goat is definitively separated from its kid(s), i.e. only when being milked exclusively (see Terminology on page 23) must be taken into account. **All goats milked on the day of milk recording, must be controlled.** Likewise, if dairy goats belonging to another farmer are being kept for part of the year at the farm where milk is being officially recorded, they must not to be included in the official recording for that farm. This is why it is essential that all goats belonging to a breeder who applies Method A or B or C milk recording for his flock(s) must be included in an up-to-date and accurate inventory.

2.3.2 Case of the method E

Method E is a flexible official method applied when the breeding purpose is to maintain the breed with all the typical standard performance signs (flocks whose only a part of the goats belongs to the flock-book). The rule of recording all the animals of the flock may not be respected (only designated goats or designated lactations are recorded).

2.4 First test-day

2.4.1 For the flock

The first test-day of the flock takes place 4 to 15 days after the beginning of mechanical/by hand milking only in the flock. This recommendation is suitable for the practical organization of tests on the basis of a monthly recording interval.

2.4.2 For a doe

2.4.2.1 Milking from kidding

The first milk recording of a doe has to take place not before 6th day from kidding and not later than 80 days after kidding to take into account the starting of milking only by batch and fluctuations in the periodicity of milk recorders' visits. If this difference is greater than the threshold described above, there should be no lactation calculation for the goat in question, save if the breed society justifies for its breed that the threshold should be higher.

2.4.2.2 Milking after suckling

The first milk recording of a doe must take place within the 35 days following complete separation from its kids, with a tolerance of 17 days to take into account the starting of milking only by batch and fluctuations in the periodicity of milk recorders' visits. Consequently, the difference between kidding and the first (quantitative) milk recording of a goat is at most equal to the average suckling length of the breed in question plus 52 days (35 + 17). If this difference is greater than the threshold describe above, there should be no lactation for the goat in question, save if the breed society justifies for its breed that the threshold should be higher.

2.5 Frequency and number of milk recording visits

2.5.1 For the flock

In the case of record of the two daily milking, the average recording interval (days) between two successive milk recording for a flock is monthly (30 days, with a range from 28 to 34 days) for A4, B4, C4 or E4 method, and it can reach 36 days for A5, B5, C5 or E5, and 42 days for A6, B6, C6 or E6 and 49 days for A7, B7, C7 or E7 method.

Methods with record at only one daily milking (either for milk & samples or only for milk) are named by the second letter (after the first letter A, B, C or E). They are defined as follows:

In the method T for alternate (AT, BT, CT, ET), there is no obligation to correct daily yield (except multiplying by 2) and content in order to calculate milk, fat and protein yield for the whole lactation. Nevertheless, correction is possible.

In the method C for corrected (AC, BC, CC or EC), recording and sampling occur at any milking at each recording visit. This scheme implies to use a correction method among those described to estimate the daily production of milk, fat and protein.

The Z method (AZ, BZ, CZ, EZ) is an alternate method for sampling while milk yield is recorded at all the milkings. As the alternate scheme is realized, there is no obligation to correct daily contents in order to calculate fat yield and protein yield for the whole lactation.

In the Y method (AY, BY, CY, EY), sampling occur once a day at any milking at each recording visit while milk yield is recorded at all the milkings. This scheme implies to use a correction method among those described to estimate the daily production of fat and protein.

The correction method must be chosen among one [the methods listed in the Section 02 – Procedure 1 – Computing 24-Hour Yield](#). It is up to the ICAR member to describe precisely the correction method used.

In those methods with record and/or sampling at one daily milking, ICAR recommends that the average recording interval be monthly (30 days), as for the A4 method (considered as the standard method). But higher intervals (5, 6 or 7) are possible depending on the lactation length. It is up to each ICAR member to decide which intervals are allowed within breeds.

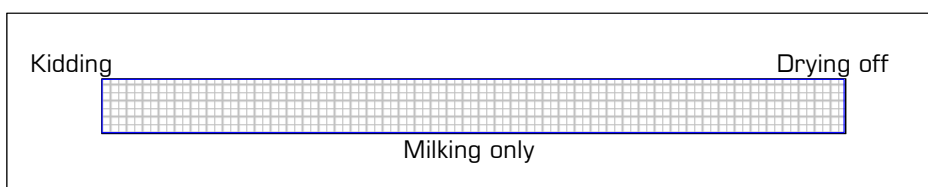
There is no minimum interval, so supplementary testing can be carried out when necessary due to the way the kidding is spread out (e.g.: a fortnight to three weeks between two successive tests).

Method	Recording interval (weeks)	Recording interval (days)		
		Average	Min.	Max.
A4 / B4 / C4 / E4	4	30	28	34
A5 / B5 / C5 / E5	5	36	32	40
A6 / B6 / C6 / E6	6	42	38	46
A7 / B7 / C7 / E7	7	49	45	53
AT / BT / CT / ET	4	30	28	34
AC / BC / CC / EC	4	30	28	34
AZ / BZ / CZ / EZ	4	30	28	34
AY / BY / CY / EY	4	30	28	34

The above intervals between 2 consecutive test-days may be changed if the breed society, for its breed, justifies other bounds of the allowed intervals.

2.5.2 For a doe

The maximum interval between two successive non-zero tests on the same doe is 2 x average number of days in recording interval (depending on method). There is thus a tolerance of one missed test. If the interval between two tests (i) and (i+1) is greater, the lactation calculation for the goat being tested (i) is stopped.



The minimum number of valid monthly tests (milk not zero) per goat needed for the lactation calculation is not set: it must therefore be described for each breed and category of goat considered (first lactation, second and more).

2.6 Quantitative milk recording

The only obligatory milk recording is that of the quantity of milk (i.e. quantitative recording). Tests on the chemical composition of the milk or qualitative tests are optional (Guidelines on optional records on page 11). Quantitative recording concerns the quantity of milk supplied by

the goat when milked in the usual conditions on the farm, whether milked by hand or by machine. Should milking be mechanical, it is recommended not to take into account the volume of individual milk collected during hand or machine stripping in order to favour indirect selection as regards ability to machine milking. If nevertheless the (hand or machine) stripping yield is recorded, it is necessary to mention it in the presentation of the results. Milk is measured at the two daily milking (method A4, B4, C4, or E4 method A5, B5, C5 or E5, method A6, B6, C6 or E6, method AZ, BZ, CZ, EZ, method AY, BY, CY, EY). However, this measurement may only be applied at one of the two daily milking: in this case, either the strict alternating monthly test is applied (method AT, BT, CT or DT) or the corrected monthly test for evening/morning differences, taking into account the total volume of milk produced by the whole flock over the two milking concerned (method AC, BC, CC or DC). Milk may be measured by weight (grams) or volume (milliliters). It is acceptable to take volumetric measurements as they are usually quicker and can be as accurate as weighing (if milk meter measurements are independent of froth). The conversion factor of weight (grams) into volume (milliliters) is 1.032 (normal goat milk density). The minimum daily quantity tested is set at 200 g or 200 ml. The limit of error (standard deviation of error) is 40 g or 40 ml. Milk should be weighted or measured by means of an instrument approved by the organization using it, and, if possible, checked by an appropriate government agency. List of approved milk recording devices for sheep and goat approved by ICR is available on ICAR web site at: www.icar.org/index.php/icar-certifications/recording-and-sampling-devices/icar-certified-milkmeters-for-sheep-and-goats/.

2.7 Lactation calculation clauses

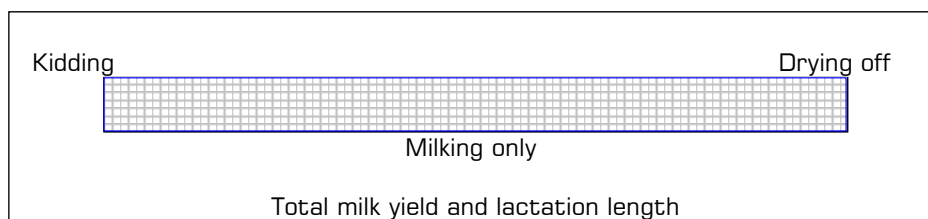
2.7.1 For the flock

A farmer must adopt a single test method for a given milk period: method A (A4, A5, A6 or A7), method B (B4, B5, B6 or B7), method C (C4, C5, C6 or C7), method E (E4, E5, E6 or E7), method AT (or BT or CT or ET), method AC (or BC or CC or EC), method AZ (or BZ or CZ or EZ), method AY (or BY or CY or EY).

2.7.2 For a doe

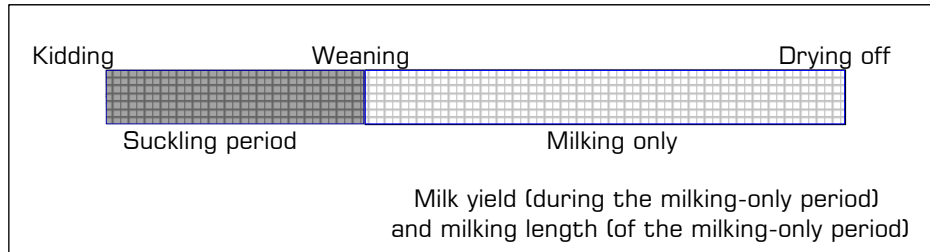
When milked from kidding, total milk yield per lactation (TMY) is calculated using the Fleischmann method (or another method if proved to be of equivalent accuracy). When milked only after a suckling period, milk yield during exclusive milking (TMM) is also calculated using the Fleischmann method (or another method if proved to be of equivalent accuracy), basic measurements only concerning the yield from milking after the kids have been fully weaned. Calculations may be based on the real weaning and drying off dates. They may also be based on dates calculated on the basis of standard lengths for the suckling period and the interval between the last non-zero milk recordings and drying off. The whole calculation procedure is defined by each country and/or breed, in which case it is necessary for the calculation clauses to be accurately described when the results are presented.

2.7.3 Milking from kidding



The total milk yield per lactation (TMY) is calculated (as for cattle), together with the corresponding lactation length [difference between the drying off date and the kidding date]. The kidding date is the real date. The drying off date is either real or calculated. There is a minimum of 3 tests per goat before applying the Fleischmann method of calculation. The calculation procedure is described by the organization responsible for its implementation.

2.7.4 Milking after a suckling period



The milk yield during the milking-only period (TMM) and the corresponding length of the milking period [difference between the drying off date and the weaning date] are both calculated. The kidding date is the real date. The weaning date is either real or calculated (standard suckling length). The drying off date is also either real or calculated. There is a minimum of 3 tests per doe before applying the Fleischmann method of calculation. The calculation procedure is described by the organization responsible for its implementation.

2.7.5 End of lactation

To estimate the milk production for the period from the last recording to the drying off, it is necessary to multiply the yield by a number of days equal to half the interval period chosen.

The lactation length chosen must be declared by the organization.

2.8 Calculation methods

The total quantity of milk and the percentage of butterfat and/or protein is to be calculated by one of the following two methods (or by another method if proved to be of equivalent accuracy). Methods incorporating the centering principle are to be preferred, i.e. centering the results for any test day on a period for which the test day is the mid-point or alternatively, by applying the average of results at the beginning and the end of a period (see Method n° 2 below).

2.8.1 Method no. 1

For each interval between two successive testings a separate calculation is made of the quantity of milk produced by multiplying the results of the weighing of the test day by the number of days in the interval leading up to it. The addition of these interval yields gives the total milk produced for the entire lactation period. The quantity of fat and protein contained in the milk is obtained in the same way.

The average percentage of fat and protein contained in the milk is obtained by multiplying the total quantity of fat and protein (in kg) by 100 and dividing these totals by the total quantity of milk (in kg).

2.8.2 Method no. 2

- a. For each interval between two successive testing a separate calculation is made by adding the results of the weighing of the two test days, and dividing by two.

- b. The quotient is then multiplied by the number of days between the two test days.
- c. The lactation yield of milk is obtained by totaling the milk yield calculated for all the intervals.
- d. The quantity of fat and protein contained in the milk is obtained in the same way.
- e. The average percentage of fat and protein contained in the milk is obtained as indicated for Method N° 1.

If recording is suspended for a period not exceeding 100 days, the missing figure or figures can be estimated by taking average of the preceding and subsequent testing, or by another suitable method

2.9 Optional records

This chapter describes:

- a. on the one hand, the optional records which can be kept within the framework of official method A, B, C or E recording;
- b. on the other hand, the method D which is a non-official method of milk recording.

2.9.1 Qualitative tests or tests on the milk's chemical composition in official method A, B, C, or E

Given that it is expensive and often technically difficult to administer in large flocks, testing milk's chemical composition (which entails taking representative samples in order to analyze fat and protein content) is optional.

Such a qualitative test may be implemented either for experimental purposes or within the framework of integrated selection schemes which are already very efficient as regards milk quantity on the scale of the recorded population in question. In the second case, the qualitative test must be part of the flock's monthly quantitative recording (A4, B4, C4 or E4; AC, BC, CC or EC; AT, BT, CT or ET; AZ, BZ, CZ or EZ; AY, BY, CY or EY) or approximately monthly quantitative recording (A5, B5 or C5, A6, B6 or C6), whether carried out each month or only certain months. Furthermore, an attempt should be made to sample all or most goats in one or more categories or classes of age found to be present during the corresponding quantitative tests in order to avoid sampling bias.

The **qualitative test procedure** is described by each officially recognized organization: objectives of the qualitative test (experimental or for selection purposes), frequency of testing, sampling procedure, categories of goats sampled and percentage with respect to those goats whose milk quantity is recorded, supervisory procedures followed (for the samples taken and milk analysis laboratories), type of chemical analysis and calculations made. Analysis for protein content (or nitrogen content) and fat content must be carried out on the same sample representative of the recorded milking. The equipment used for determining fat and protein content should be submitted to periodic checking in accordance with suitable standards, approved by ICAR.

- a. Methods approved by the Committee for estimating the fat and protein (or nitrogen matter) contained should be employed.
The equipment and materials used for analyses should be prepared or checked by the technical services of the same organization.
- b. Analysis for protein content (or nitrogen content) and fat content must be carried out on the same milk sample.

The samples should be taken after the milk produced by a single goat has been properly mixed. A 24 hour composite milk sample is required for analysis. If a preservative is used it should not influence the results of the sample analysis.

- c. The equipment used for determining fat and protein content should undergo periodic checking in accordance with suitable standards.

Every member organization is required to inform the Committee of these standards.

2.9.2 Other types of testing in official method A, B, C or E

Other possibilities following on from the qualitative milking recording include somatic cell count, mastitis and similarly, for other milk characteristics, the possibility of measuring machine milking ability via milk flow (milking speed) which can be recorded using automated goat milk recording systems. Even before milk recording, reproductive traits could also be recorded; this includes information on the reproduction method (artificial insemination following induced oestrus, induced oestrus and hand mating, natural mating etc.), the number and sex of kids born, the days open (time from kidding to conception), etc. Procedures for such optional measurements are described by the officially recognized organizations responsible for their implementation.

2.9.3 Method D

Method D is defined as a simplified non-official recording based on 2 to 4 recordings per flock and per year in the aim to get 2 to 3 test-days per goat in the middle of the lactation. The record may be realized either on one of the daily milking on all the goats being exclusively milked at the test-day, or on all the daily milking on all the goats being exclusively milked at the test-day. Of course, it is recommended to record only one of the daily milking since it is a very simplified method. In this case, the test-day may be adjusted in order to get daily milk (for instance by multiplying it by 2 or by any other coefficient taking into account the morning/evening difference). The purpose is to implement a within flock ranking of the goats (either an individual ranking or a ranking in sub-parts of the flock - in three thirds or four quarters for example) to manage replacement and culling. The ranking may be based on such criteria as average test-day or lactation calculation corrected or not for variation factors such as lactation number, age, month of kidding... Nevertheless, in such simplified design lactation calculation is not recommended even though possible, given the low number of test-days per goat. This method D may be useful in two types of situation:

- a. It may be applied to commercial flocks out of a well-established nucleus of a pyramidal breeding scheme.
- b. This type of simplified milk recording should also be suitable in developing countries in order to provide advice to farmers on feeding, health, breeding (and if possible on genetics). In this situation, it could be the first step before the implementation of an official recording for genetic purposes.

Whatever the situation, method D does not provide ICAR Certificate of quality.

2.10 Presentation of results

This paragraph concerns the methods A, B, C or E

To facilitate the presentation, the following vocabulary is used for total milk yield calculations:

- a. Total milked yield

- b. Milking length.

Total milk yield equals: Total milk yield per lactation (TMY) in the case of milking from kidding or milk yield during the milking only period (TMM) in the case of milking after a suckling period

Milking length equals: Lactation length in the case of milking from kidding or length of the milking-only period in the case of milking after a suckling period

The production may be expressed in kg or in l. The milk quantity produced in the strippings must not be included. Determination of fat or protein content (or nitrogen matter) is optional.

2.10.1 Obligatory results

It is obligatory to provide the following results for a given breed and a given year or milk period:

2.10.1.1 Information on the milk recording and calculation methods

- a. Organizations responsible for the milk recording.
- b. Method of quantitative recording used: method A4, B4, C4 or E4, A5, B5, C5 or E5, A6, B6, C6 or E6, AT, BT, CT, ET, AC, BC, CC or EC, AZ, BZ, CZ or EZ, AY, BY, CY or EY.
- c. For method with correction of milk and or fat/protein, the method must precisely described.
- d. Unit of measurement used for milk quantity: liters or kilos.
- e. Type of milk recording equipment (milk meter...) used: to be described.
- f. Organization responsible for the lactation calculation.
- g. Drying off date: real or calculated; specify the procedure if calculated or describe whatever rule is applied to determine the end of the milking period.
- h. Kid weaning date (should there have been a suckling period): real or calculated; indicate the average length of suckling used should this date be calculated.
- i. Minimum number of milk recording tests per goat to calculate milk yield.
- j. Calculation of total milk yield: based on the real length of milking or a standard length to be described.
- k. Published milking length: provide the calculation formula [difference between dates used].
- l. Existence of adjustments for milk yield or not: type and description (example of adjustments for age, kidding period etc.).
- m. Existence of supervisory systems or not: type and description.

2.10.1.2 Information on the flocks subject to official method A, B, C, D or E milk recording

- a. Number of farms subject to official milk recording (year).
- b. Number of goats on these farms (inventory at kidding).
- c. Number of lactating goats on these farms (calculated milk yield).

- d. What system is used as regards lactation:
 - system 1: milking from kidding;
 - system 2: milking after a suckling period.
- e. If system 2: average length of the suckling period (in days) and description of the initial suckling or suckling plus milking phase.
- f. Description of reproduction objectives: achievement of one or more kidding per milking period; age at first kidding.
- g. Type of milking: machine (% of farms and goats subject to official recording) or by hand (% of farms and goats subject to official recording).
- h. Results of milk recording: total milked yield and length of milking (cf box above); average daily milk yield (total milked yield divided by the milking length). If possible, the milk yield results should be presented for all lactations and according to lactation number. Furthermore, raw milk results should be provided with no adjustment for factors of variations.

2.10.1.3 Information on the goats

The following information must be provided for each lactation whose obligatory results are published:

- a. The goat's ID.
- b. Age at kidding.
- c. Lactation number or category of age (to be described).
- d. In the case of suckling, the real or standard suckling length.
- e. Total milk yield (without adjustment): TMY or TMM.
- f. Milking length.
- g. Average daily milk yield.

It is possible to publish also the followed other results:

- a. Difference (in days) between the kidding date and the date of the first test day.
- b. Maximum milk recording test (with the lactation stage).
- c. Total number of monthly milk tests realized for this doe.
- d. A production of reference (and the chosen standard length).

2.10.2 Publication of results of optional recording

2.10.2.1 Information on the implementation of qualitative milk recording

This paragraph concerns the methods A or B or C or E (2.9.1 and 2.9.2) and the method D (2.9.3).

Information on the implementation of qualitative milk recording

- a. Objectives of the qualitative testing: experimentation or selection.
- b. Description of the sampling procedure used.
- c. Test methodology used: milking tested, test frequency, categories of goats sampled.

- d. Results: percentage of goats sampled in relation to the goats tested for milk quantity (for the same category of females).
- e. Analyses: type of milk analyses, methods and units of measurement used for results.
- f. Calculations made: description of the type of calculations and results published.
- g. Presentation of mean results - breed, flock and goat.
- h. Existence of supervisory systems or no: type and description.

2.10.2.2 Reproduction results

- a. General description of breeding system distinguishing 2 main systems: one kidding per year or aiming to have several kidding per year.
- b. Description of reproduction methods used (and their frequency for farms subject to milk recording): induced estrus and artificial insemination, induced estrus and hand mating, natural mating. (Open day - time from kidding to conception).
- c. Results of average age at first kidding depending on the reproduction method.
- d. Description of kidding periods (frequency) per age group and reproduction method.
- e. Average fertility results per age group and reproduction method.
- f. Average prolificacy results per age group and reproduction method.

2.10.2.3 Other optional results

These results can be provided for the breed, flock or goat or region. The following information is an example of such optional results:

- a. Results of weighing kids at birth or on weaning.
- b. Results of weighing goats at parturition or kidding.
- c. Causes for reform in the framework of milk recording.
- d. Frequency of mastitis etc....

2.10.2.4 Method D

Precise description of method D used as a simplified design:

- a. Design (number of recordings per flock and year)
- b. Calculations and type of ranking set up.

Whatever the design, calculation and type of ranking, method D has no ICAR Certificate of quality.

3 Annex 1. Dairy Sheep - rules and standard obligations in all situations

3.1 Ewes to be controlled

Whenever there is (quantitative) milk recording for the recorded flock, all the ewes being exclusively milked (of the breeds or genotypes involved in the breeding programme) must be recorded i.e. milk recording is realised only when the ewe is definitively separated from its lamb(s). In the case of method E, these rules may not be respected.

3.2 Type and expression of milk recording

- a. The only obligatory milk recording is that of the quantity of milk (i.e. quantitative milk recording). That is to say, tests on the composition of the milk (or qualitative tests for fat and protein content) are optional.
- b. Milk may be measured by weight (grams) or volume (millilitres). The conversion factor of weight (grams) into volume (millilitres) is 1.036, which corresponds to the normal sheep milk density.
- c. The minimum daily milk yield tested is set at 150 g or 150 ml.
- d. The limit of error (standard deviation or error) is 40 g or 40 ml.

3.3 Frequency of milk recording visits

Monthly method

Recording length (hours)	Average daily recording interval ($\pm 10\%$)	Symbol	Authenticity
24	30	4	A4/B4/C4/E4

Others

Interval Number 36			
24	36	5	A5/B5/C5
Interval Number 42			
24	42	6	A6/B6/C6
Alternate Milkings			
24	30	T as a second letter	AT/BT/CT/ET
Corrected Milkings			
24	30	C as a second letter	AC/BC/CC/EC

Interval depending on the situation of the lambings in the flock.

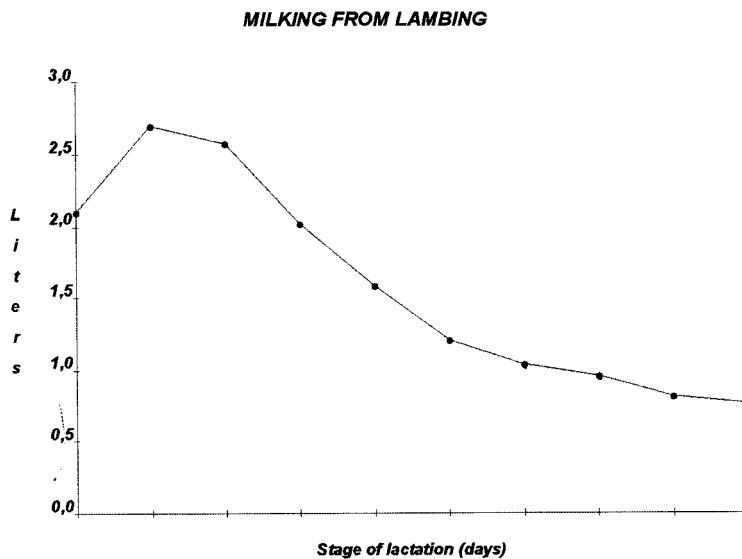
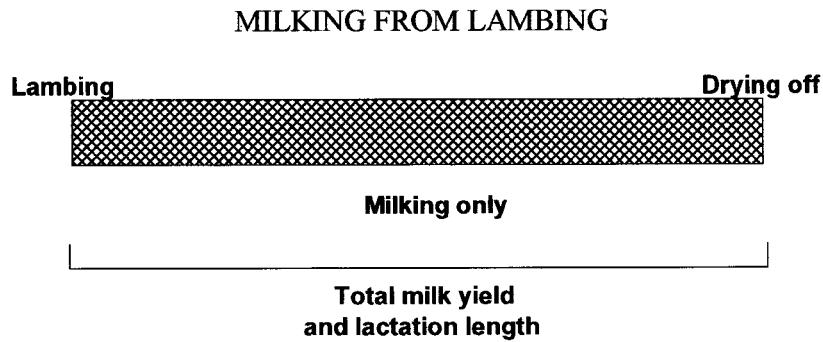
Note 1:

- a. AT, BT, CT, ET: Alternating monthly test (recording of only one of the two daily milkings).
- b. AC, BC, CC, EC: Corrected monthly test for evening/morning differences (recording of only one of the two daily milkings), taking into account the total volume of milk produced by the whole flock over the two milkings concerned (bulk tank weights).

Note 2:

No set total number of recording visits per year (described by each official organisation).

4 Annex 2. Dairy Sheep - lactation calculation clauses if milking from lambing

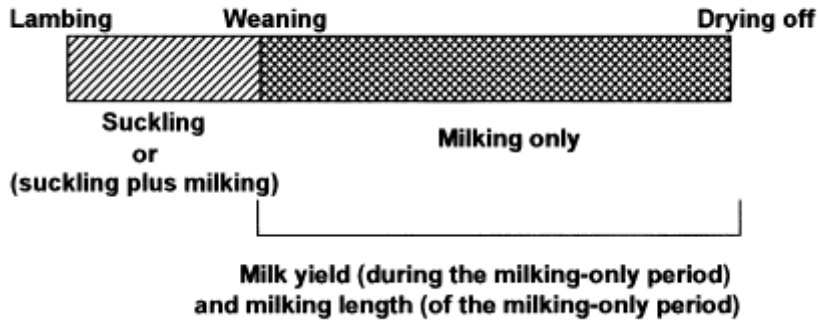


TOTAL MILK YIELD

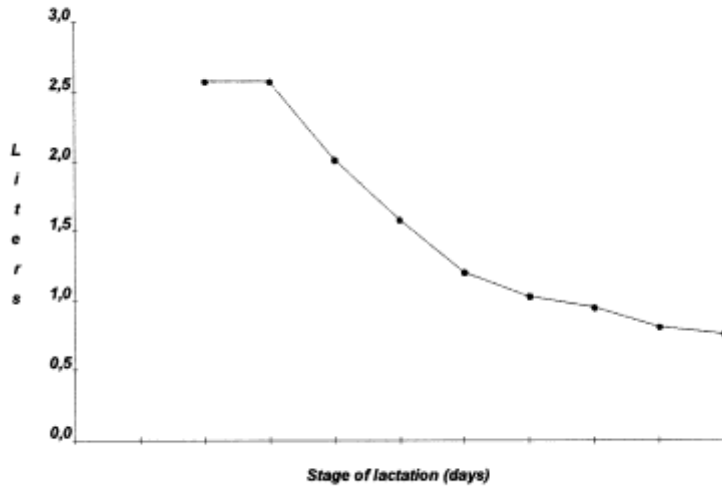
We recommend that the approved organisations define, for each breed and category of ewes (age or lactation number), a production of reference per lactation, with a standard lactation length close to the average lactation length of the considered breed (according to its breeding system).

5 Annex 3. Dairy Sheep - lactation calculation clauses if milking after a suckling period

MILKING AFTER A SUCKLING PERIOD



MILK YIELD AFTER A SUCKLING PERIOD



MILK YIELD DURING THE MILKING-ONLY PERIOD