Recommendation for recording and validation of AI data
(to be adopted by the ICAR board)

1 Object of the recommendation

The purpose of this recommendation is to improve quality of data in Artificial Insemination of cattle (AI) by harmonising and improving data collection for guaranty high level of exchanges at international level. It recommends the minimum items that should be recorded for using AI data and the minimum of controls that data must undergo for being declared as valid.

Annex 1 describes the minimum requirements for purposes other than genetic.

2 Field of application of the recommendation

The recommendation applies usage of AI data for genetic purposes such as:

- Using AI data to establish parentage of bovines prior to registration in the herd-book and/or in files used for genetic evaluations for any trait
- Printing AI on pedigrees of pregnant females
- Genetic evaluation fertility of bulls, daughter fertility and establishment of Non-Return-Rates

It applies to bovine populations for which parentage is systematically recorded such as herds on performance recording (milk and beef) and/or herds registered in the herd-book.

It applies to countries were bodies are approved to enter AI data in the genetic data processing system for the above mentioned purposes.

It non applies to non genetic purpose

3 Definitions

*First AI*: first insemination to breed a heifer or after the end of each pregnancy to breed a cow.

*Return*: AI carried out after a first tentative within a given reproductive period. A rank is attached to each return.

*Rank*: order of the return after the First AI (2, 3, 4, …)

*Fecundating AI*: AI which is not followed by a return during a given period of time (2-3-4 months), or followed by a positive recorded pregnancy diagnose, or by a calving after a period matching with the gestation length of the breed(s)

*Double AI*: two AI carried within a short lap of time, e. g 48 hours, on the same female with or not the same bull. This information is recorded to avoid rejection when verification of dates.
Operator: person performing the artificial insemination, hired by AI stations, free-lance, veterinarian technician, farmer

Special characteristics: technical indication related to the semen (liquid / frozen, dilution), or to the straw (split-unit), or to special purpose of the AI (embryo production)

4 Recording of AI data

Data mentioned below are those that have to be transmitted to a data processing centre in charge of genetic procedures. In general the format of those data is not defined by this recommendation. Items 4.1 to 4.11 have to be recorded compulsory.

4.1 Summary of items constituting the data set when AI are recorded:

When AI are recorded, some items have to be registered compulsory, by hand (paper form) or by electronic devices (laptop computers, PDA.). Those data will constitute the basic database.

Requested data are:
AI centre or organisation/body in charge of processing AI for genetic purposes.
Operator
Date
Herd
Female inseminated
AI bull
Some data will help the data processing and then used for optimisation of it.

Options:
For an improved system of recording desirable data may be added
Rank
Double AI
Special characteristics
Batch number of straw

4.2 Order of items

Recommendation does not address the order of items. The description of order has to be mentioned when data are exchanged.

4.3 Support

AI data are recorded either on forms either on electronic data files.

4.4 AI Centre or organisation/body issuing AI data

AI records have to be traced back to the AI centre or organisation issuing AI data.

4.5 Operator

The responsible organisation has to use a system to identify the operators in order to track back each insemination. Operators may be: technicians employed by the station, vets or inseminators under contract, free-lance operators, and farmers.
4.6 Date
The date of the day when the female was inseminated has to be recorded for each AI.

4.7 Herd
Herd has to be identified within the national system of registration dedicated to genetic data processing.

4.8 Female inseminated
Females have to be identified within the national system of registration dedicated to genetic data processing. The identification number of females including country code has to be recorded for each AI.

Options:
- Breed code may be optional recorded. The date of birth and the number of calving may not be recorded if the registration system is recording this information.
- Name and internal working number are not recorded compulsory.

4.9 AI bull
The female has to be bred by semen of an AI bull, known through the reference of its semen. The identification of the bull is that defined by the “ICAR guidelines for straw identification for bovine semen” as the international identification code or a world-wide unique bull code. One of those codes has to be recorded for each AI.
If a bull code is used, it must be linked with the international identification code after the recording, for genetic purposes.

4.10 Rank
The rank of intervention of each AI carried out within the same reproductive cycle has to be determined either by recording, either by the date known in the computer.
- The number of the rank is 1 for the first AI or greater or equal to the rank of the previous AI plus 1 for each return.
- In case of double AI the number of the rank has to be equal to the rank of the previous AI.
Remark: computer can determine the rank. The farmer or technician should not enter this information in the computer or write it down.

4.11 Double AI
The existence of a double AI has to be mentioned either by recording of a code either automatically.
4.12 Special characteristics

Special characteristics regarding the used straw, the semen or the service itself may be recorded in order to help the interpretation of AI data. The data dictionary accompanying data file must describe those characteristics.

It could be mentioned: freezing technology, dilution characteristics, split straw, sexed semen, AI for embryo production etc

5 Tests for validation of AI data.

After recording AI data have to undergo series of test prior to be used in the genetic system. Those tests may be carried out at various levels according to the organisation and the equipment

5.1 Completeness and integrity of data:

Each item recorded must be checked against the data model to prove the intrinsic validity of data. All necessary data have to be available prior processing.

5.2 Test of coherence.

When arriving in the database the items of AI records have to be checked against existing files to prove their coherence with existing information:

✓ The number of the organisation is known in the base
✓ The number of the operator recorded is declared by a recognised organisation
✓ The herd is registered
✓ the female is registered
✓ The AI bull is registered

Moreover regarding the female:
✓ The identification corresponds to an animal registered as a female
✓ The female is old enough to be bred (parameters defining the authorised limits are set up by country / breed / operator).
✓ If two AI are carried out on the same female on the same day an alarm message has to be edited
✓ The female is alive

Moreover regarding the AI bull, it is recommended that the semen used correspond to a declared stock in the database.

5.3 Likelihood tests

In order to secure the information likelihood tests have to be carried out:

✓ The female was registered in the herd the day where the insemination was carried out.
✓ The bull was recognised as an AI bull when the semen was used
✓ There was a minimum period between the first AI and the last return of the previous cycle of the registered end of pregnancy (parameters defining the authorised limits are set-up by country / breed / operator).
✓ The herd identified is an active one ( cattle are recorded within this particular herd)
6 Transmission of AI data to data bases for parentage assessment.

This recommendation aims to improve parentage assessment when AI data are brought together with other relevant data such as birth date.

Some extra conditions are required on the transmission of AI data:

- AI data have to be transmitted on a regular frequency to the data base where there are brought together with birth data.
- AI data have to be available in this data base prior to the arrival of birth data.
- All AI data have to be available in the data base whatever they are successful or not.

By bringing together all AI data and birth data, it is possible to assess the fecundating AI according to the dates recorded for birth and AI and the gestation length of the females of the breed. If only this information is required to be transmitted, the responsible body in charge of data processing has to describe the used method.

7 Quality controls.

The efficiency of any information system depends on the quality of data proving that the expected result fits with the goal. For AI, regarding the genetic applications it deals with the accuracy of the records and with the proof that the progeny from mating was born from foreseen parents.

It is recommended that the organisation in charge with AI data processing carries out following controls and implement relevant indicators:

- Counting of failures on each test suggested above, in terms of completeness, integrity, coherence and likelihood of AI data.
- Implementing random sampling test using blood types or DNA analyses to prove (or reject) the parentage of some groups of animals or specific animals.
ANNEX I

Minimum requirements for purposes other than genetic

AI data are used for purposes other than strictly genetic, for management of the reproduction at herd or individual level.
In such a case bull information is not crucial, but the precise inventory of the herd with the in & out date of females is very important.

In addition to the recorded items on AI describe above, such as AI and births records, other data should be registered:

✓ dates of the end of any pregnancy including stillborn
✓ observations of heat detection
✓ females treated for oestrus synchronisation. (note that in some cases it is important to record the protocol with dates, products, on the group that has been treated)
✓ pregnancy diagnose (method, results)

For each item the identification of female has to be recorded with an unique number at least within the herd.