ICAR working group on Recording, Evaluation and Genetic Evaluation of Functional Traits

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Members of WG

- Ab Groen, NL
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- Nicholas Gengler, Belgium
- Johann Sölkner, Austria

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Objectives

- writing a portfolio of recommendation sheets on recording, evaluation and genetic improvement for functional traits in dairy cattle. Recommendation sheets will be written for seven functional trait groups:
- udder health
- female and male fertility
- calving ease and stillbirth,
- feet and legs problems,
- workability,
- longevity,
- metabolic stress and feed efficiency.

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Aims of guidelines

- Suggest "good practices" for recording and evaluation
  - Good practice may depend on country and change over time
- Step-wise decision-support in developing a recording and evaluation system for fertility, to support genetic improvement in dairy cattle
  - Both when starting a new program and when updating an existing one

Layout of guidelines

- General introduction
- Background information on fertility and correlated traits
- Step-wise decision support for recording and evaluating fertility and correlated traits

ICAR-GIFT Guidelines on Recording and Evaluation of Fertility a first draft

First draft

- Only female fertility
- Male fertility to be covered separately
- Decision support tree
- Decision depending on:
  - Availability/Possibility for recording
  - Quality of traits, e.g. h^2, correlation with goal
  - Philosophy: Better something than nothing

Female fertility has several aspects

- Fast return to normal ovarian activity after calving
- Strong signs of estrus
- High probability of conceiving when inseminated at correct time
- Ability to carry pregnancy to term

Step-wise decision support Step 0 - Prerequisites

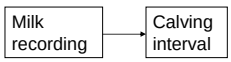
- Unique animal and herd id system
- Animal pedigree information
- Birth recording
- A well-functioning central data base
- Milk recording system

- Everything following Interbull recommendations

Decision support tree

Milk recording

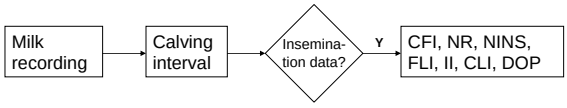
Decision support tree



Step 1 – Calving interval

- Data from milk recording system
- Measure of return to cyclicity, estrus, conception rate, and ability to keep embryo.
- Only available for cows which have a subsequent calving
  - bad fertility sires will have more of their daughters with missing calving intervals and won't look as bad as they are
  - important to handle this censoring somehow, and not exclude culled cows
  - takes long time to get information

Decision support tree

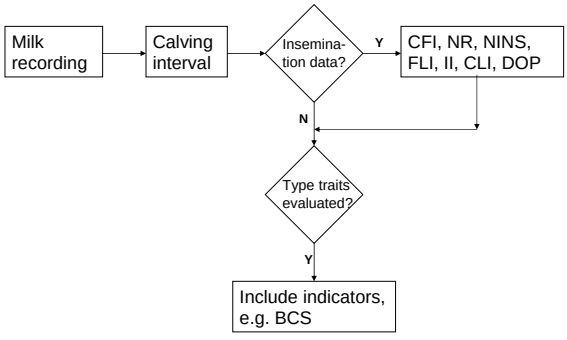


Step 2 – Measures based on insemination dates

Trait	Return to cyclicty	Estrus	Concep-tion rate	Keep embryo
Calving to first ins. CFI	++	+		
Non-return rate NR			++	+
Number of ins. per series NINS		(+)	++	
First to last insemination FLI		+	++	
Insemination interval II		+		(+)
Calving to last insemination CLI	+	+	+	

Generally low heritabilities, 1-4%

Decision support tree



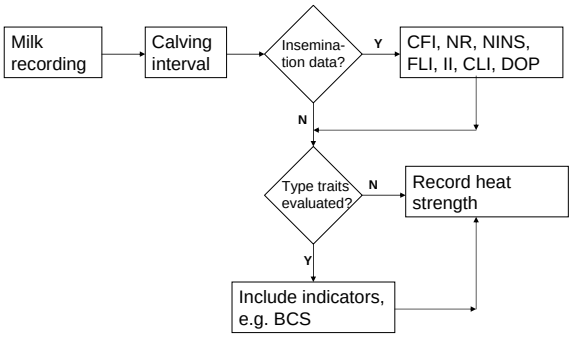
Step 3 – Body condition score

- Can be fairly easily added to type trait evaluation (if not included)
- Measure of body reserves and energy balance
- Related to return to cyclicity, estrus strength, and probability of conception
- Rather high heritability, similar to milk

Step 3 – Other type traits?

- Some type traits (mainly related to ”dairyness”) unfavorably correlated to fertility
- May be through relationships with milk yield and body condition, may not add any new information.

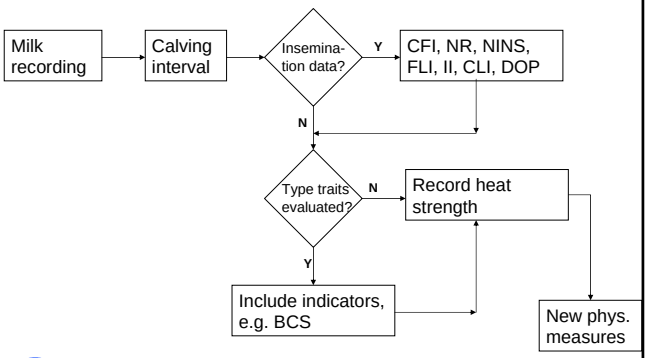
Decision support tree



Step 4 – Heat strength

- Can be recorded by the farmer or the inseminator and reported with the insemination data (or milk recording data)
- Low heritability, many daughters needed
- Other measures (pedometer, conductivity) can be used for management purposes

Decision support tree



Step 5 – Physiological measures

- Progesterone profiles to identify various measures of fertility
- Calving to first luteal activity CLA
  - Higher h^2 than CFI (0.16-0.21)
- Proportion of samples with luteal activity within first 60 days, PLA
  - h^2 14% with monthly sampling, high r_g w/ CLA
- Not influenced by farmer decisions
- Cheap, in-line measurements in future?

Working procedure for guidelines

- GIFT working group
- Contacted specialists
- ICAR conference(s)
- Free suggestions via Interbull discussion forum (National genetic evaluation) and ICAR homepage
- …

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