BCS and conformation: from recording to data quality assurance

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ICAR Conformation Working Group

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Terms of reference: Objectives

i. To standardise the methods of assessment of conformation in accordance with rules and standards as established by each world / international federation of respective breeds
ii. Breeds to be considered are farm livestock animals (in order of priority for the group):
   a. dairy cattle breeds
   b. beef cattle breeds
   c. dual purpose cattle breeds
   d. goats and sheep
   e. other breeds of interest for ICAR
iii. Improve transparancy in data collection and quality control

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Terms of reference: Mandate

i.   Describe standards for traits for assesment of conformation

ii.   Describes methods to improve the quality of the assesment by an organization (quality control): monitor system for classifiers

iii.   Being discussion platform for new issues, raised by any member of ICAR

iv.   Ensure that new methods for scoring traits (camera, milk robots, etc) and the way of recording traits by classifier are compatible so scores from both ways can be used as source for genetic evaluations

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Harmonisation conformation

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Harmonisation of conformation for
- Dairy cattle
- Dual purpose cattle
- Beef cattle
- Goats

Up to now mainly based on scores by classifiers

BCS

**Trait has first been defined by WHFF**
Same definition used for ICAR

Scale is 1-9 (or 5-50)

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18. Body Condition Score
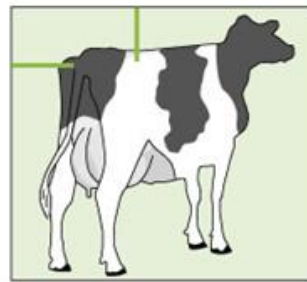*Ref. Point:* The covering of fat over the tail head & rump. Not a true linear trait

1 Poor
5 Intermediate
9 Grossly fat

With a score from 1-6 there mainly has to be looked at the loin, while the tail implant is important with the higher score (7-9).
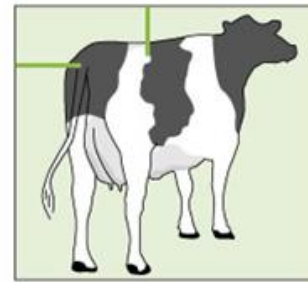

| 1 | 5 | 9 |
| Poor | | Grossly Fat |

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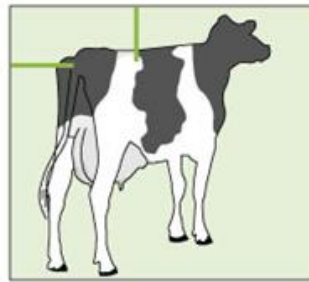
For ICAR important topics

A. Improve accuracy of data collection
- All classifiers apply the same trait definition
- Apply the same mean
- Apply the same spread

B. Improve genetic correlation between countries → exchange genetics
- Apply the same trait definition

A. Improve accuracy of data collection

Tools

- National group training sessions
- Statistical monitoring of classifiers' performances
  - mean, spread, normal distribution
- Compute correlations between classifiers

B. Improve genetic correlation between countries

Tools

- International training sessions of head classifiers
  - E.g. WHFF harmonisation sessions
- International group training sessions
- Audit system
- Optimise genetic evaluation system
  - in case of trait definition change: right action in the EBV system

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National group training sessions

**Attention points for group of cows used:**
- Representative for the whole cow population
- Discuss the results openly
  - Why this score on this cow
- Analyse the scores of each classifier
  - Mean and standard deviation
- Compute the spread of the deviation of the scores
  - Deviation from group mean of score of classifier → check on consistency

'Value' of conformation traits

- Started with describing the 'true' type

- Indicator for productivity and longevity

- Now also indicator for functional traits

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BCS relation with functional traits
New chapter in ICAR guidelines

Body Condition Score
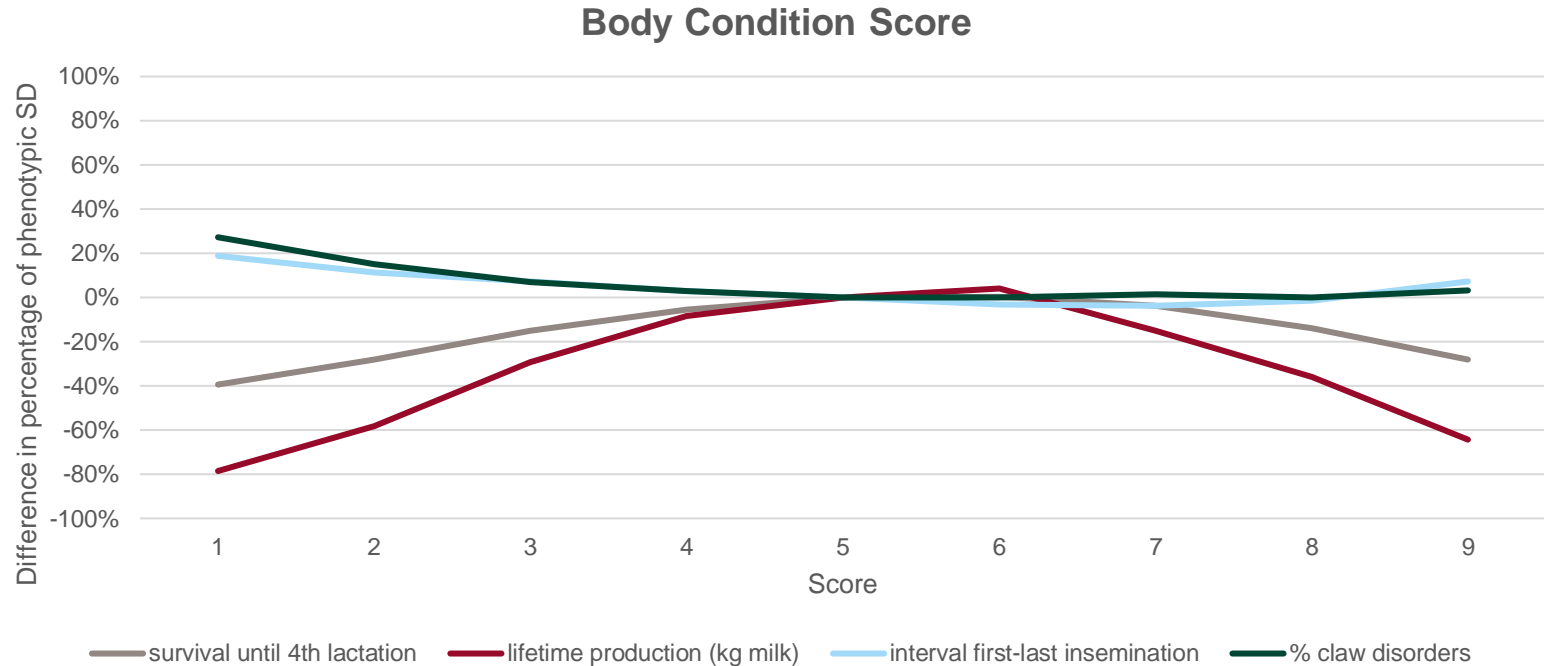
The way to certify/validate different sensors for conformation traits

Current situation

Development of new sensors / technology
- BCS measurement of DeLaval (on the market)
- BCS of Ingenera (on the market)
- Body and muscularity traits in beef breeds by Ingenera/Idele/FCEL
- 3D Morpho Ouest/INRA/Idele
- …

Current situation (2)

- Sensors produce scores for traits, like BCS
- Data is available in the background
  - Teatcoordinates in Lely AMS

What is the quality of the produced scores?
How to use new data to derive current or new conformation traits?

Purpose of data/scores

Usage for management *vs.* genetic evaluation
- For management higher accuracy and precision is needed
- Solved in genetic evaluation by
  - Heritabiliy
  - Amount of data
  - Genetic correlation

Farmers needs to rely on the one number/score

Quality of derived scores

- Repeatibility of scores: how accurate does the system work
- Compare score with the golden standard of existing conformation trait
- Check score of new trait on added values for predicting the traits of interest (e.g. Longevity)

BUT what is the golden standard
- Classifiers: produce scores or measure for most traits
  - Linear traits: one dimension
  - Difficult traits: not one dimension: **BCS**, angularity, locomotion
- Correlation among classifiers, scoring same animals/traits is not 1.0

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How to define golden standard?

One dimension trait: measure in cm's
• But still measurement errors (due to human or animal)

Multi dimension trait:
• Score from a panel
• Use average score

The sample of animals used should have the same mean and standard deviation as the whole population (representative)

Questions?