



## The ICAR Guidelines on Artificial Insemination and Related Technologies

**Dr. Fritz Schmitz-Hsu** (徐福瑞)

Co-Chair ICAR Working Group Artificial Insemination & Related Technologies

Senior Geneticist, Swissgenetics, Switzerland

## Background

- Several hundred millions of semen units produced worldwide per year
- Several hundred thousands of embryos transferred annually
- Intensive international trading of semen and embryos

## Questions and needs

- How to produce and label semen units?
- How to record data in context of artificial insemination and embryo transfer?
- How to assess fertility?
- How to facilitate data exchange in this context?
- What is currently done?
- What kind of international services are needed?
- ...

## The big picture

- What are the Guidelines good for?
  - for farmers?
  - for the industry?
- Who is ICAR?
- Who maintains the Guidelines?
- What are the current developments?

## ICAR fact sheet

- ICAR: The International Committee for Animal Recording
- International Non-Governmental Organization (INGO)
- Formed on March 9th, 1951, in Rome
- ICAR is composed of 117 Members from 59 countries; 87 Full Members, 30 Associate Members.

## ICAR's members

ICAR has 117 members (87 Full members + 30 Associate members) in 59 countries



Countries (in dark blue) with at least one organisation as ICAR Member

## ICAR Mission Statement

Mission of ICAR is to be the leading global provider of Guidelines, Standards and Certification for animal **identification**, animal **recording** and animal **evaluation**.

ICAR wants to improve the profitability, and sustainability of farm animal production by:

- Establishing and maintaining **guidelines and standards** for best practice in all aspects of animal identification and recording.
- **Certifying equipment, and processes** used in animal identification, recording and genetic evaluations.
- Stimulating and leading: continuous improvement, innovation, research, knowledge development, and **knowledge exchange**.

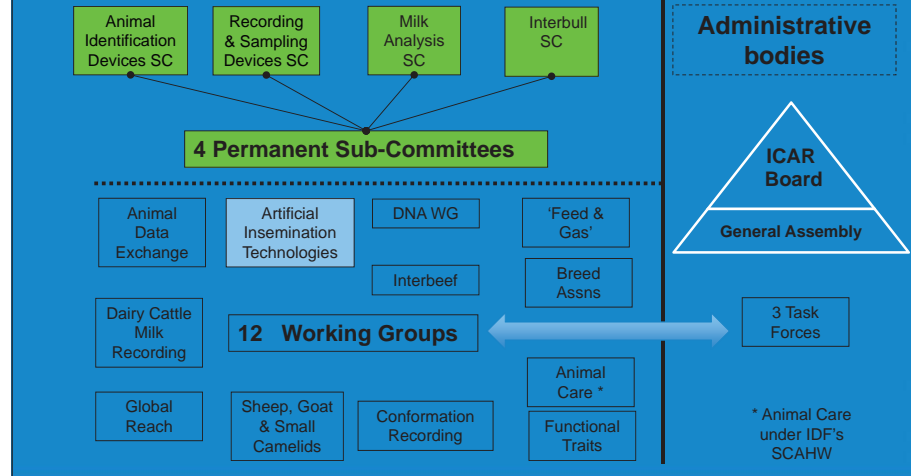
## ICAR's focus

- **For members**
  - ICAR is there for its members: farm and breeding organizations facilitating 'their' local farmers in data-recording and evaluation of production animals.
- **Help to make reliable farm management decisions**
  - Farmers need to be able to rely on data, in order to make management (including breeding) decisions.
  - Their aim is our aim: produce healthy, safe and sustainable food in a valuable way.
- **In close cooperation with associate members**
  - ICAR cooperates closely with those organizations that provide products and services to our members in the recording and genetic process and in farm management information.

## ICAR Structure

- ICAR is “The” international reference guideline for animal identification, recording systems, data analysis and genetic evaluation
- The ICAR activities are managed by:
  - 4 Permanent Sub-Committees (SCs)
  - 12 Working Groups (WGs) plus 3 Task Forces and various Expert Advisory Groups which support the SCs & WGs

## ICAR Current Technical Organisation



## The topics the ICAR Artificial Insemination and Related Technologies Working Group (ICAR AI & RT WG) is addressing

- provide, update and extend universal recommendations in the field of artificial insemination (and embryo transfer), mainly in cattle → **establish guidelines**
- conduct surveys what is currently done → **learn & document**
- identify new needs in this context → **foresee**
- propose services ICAR could offer → **suggest**
- stimulate and facilitate international collaboration in research and development of all aspects of artificial insemination data recording and evaluating → **promote, collaborate**

## Current members of the working group

- Olivier Gérard, Alice, France (Co-Chair)
- Fritz Schmitz-Hsu, Swissgenetics, Switzerland (Co-Chair)
- Jens Baltissen, German Livestock Association (BRS), Germany
- Melton DeJarnette, Select Sires, USA
- Jos Hooijer, CRV, The Netherlands
- Lamberto Morelli, INSEME SpA, Italy
- Richard Spelman, LIC, New Zealand

Very actively supported by

- Laurent Journaux, ICAR Board, Institut de l'Elevage, France
- Brian Wickham, ICAR Secretariat, Ireland

## The ICAR Guidelines (www.icar.org)

Section	Title
1	General Rules
2	Cattle Milk Recording
3	Beef Cattle Recording
4	DNA Technology
5	Conformation Recording
6	<b>AI and ET Data and Fertility Analysis</b>
7	Bovine Functional Traits
8	Certificate of Quality
9	Dairy Cattle Genetic Evaluation
10	Identification Device Certification
11	Milk Recording Devices
12	Milk Analysis
13	On-line Milk Analysis
14	Alpaca and Goat Identification and Fibre
15	Data Exchange
16	Dairy Sheep and Goats
17	Buffalo Milk Recording
18	Breed Associations

## What is in the Guidelines about Artificial Insemination and Embryo Transfer?

1. Bovine Semen Straw Marking  
Information to be printed on the straw, barcoding, breed codes
2. Bovine Embryo Production and Transfer  
Recording of relevant data, parentage assessment, quality control
3. Fertility Reporting for AI organisations  
Measurements/definitions, rules of calculation
4. Annexes
  - Incidence of the chosen option for the exclusion of short returns
  - Consideration of cattle reproductive physiology
  - Embryos storage and movements
  - Validation of data
  - Survey results

## ICAR recommendation for semen straw labeling



### A) Clear text

Position	Information
1	Semen Collection Center (SCC) code (EU stud code or NAAB code)
2	Breed Code (Interbull)
3	Bull ID (Interbull ID, NAAB code or ISO country code + national bull number)
4	[Bull name]
5	[Collection sequence, production date]
6	[Compulsory information, e.g. EU IBR status]

## ICAR recommendation for semen straw labeling



### B) Bar code

Position	Information
1	Semen Collection Center (SCC) code (NAAB code)
2	Batch ID (number for semen of a bull collected on a specific day processed identically)

Bar code type: 128C  
Bar code length: up to 13 digits

## ICAR Recommendations for fertility reporting

### Summary

- Use Non-Return Rate (NRR)
- Based on first inseminations only
- Exclude short returns (returns 0 - 3 days after first insemination)
- Correct for different effects, at least for parity (cow/heifer)

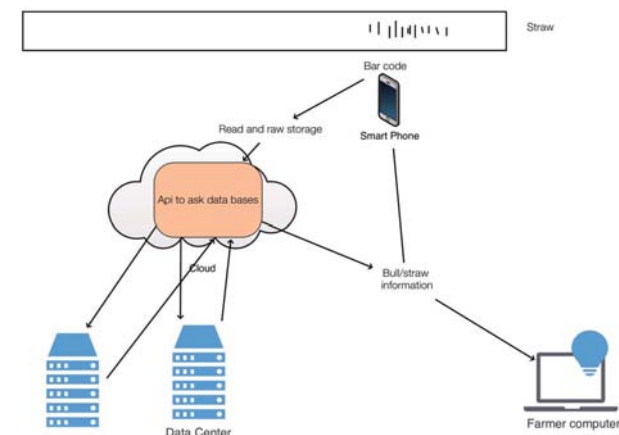
## What is the AI & RT WG working on?

- Maintain guidelines
- Update information on what is printed on semen straws
- Conduct a survey on barcoding
- Initiate a project for establishing an International Database for Semen Information

## Results of a recent survey on bar coding

- Replies from 31 semen collection centers worldwide
- Present capacity for straw bar coding exceeds implementation
- Primary obstacle appears to be lack of need or demand at the farm level
  - Lack of tools and programming to capture and store freeze batch data within popular on-farms record keeping system
- Producer demand at farm level needed to drive incentives for greater implementation of bar codes in global bovine AI industry

## The idea of an International Database for Semen Information



## Conclusions

- ICAR is a very important international organization to set standards and for providing services in livestock production, and an excellent open platform for best practices and shared development
- Standards for AI and ET make the life easier for all users (farmers, AI and breeding organizations, research institutions etc.) worldwide
- More can be done ...

## Cattle genetics from Switzerland

Taiwan, 04 June 2019



KeLeKi

## Swissgenetics' Genetic Programs

Brown Swiss



Red Holstein



Holstein



DAIRY breeds

Original BV



Simmental



Swiss Fleckvieh



Beef

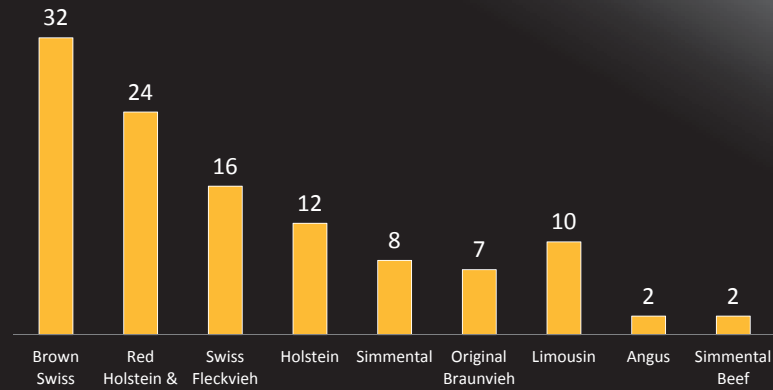


DUAL PURPOSE breeds

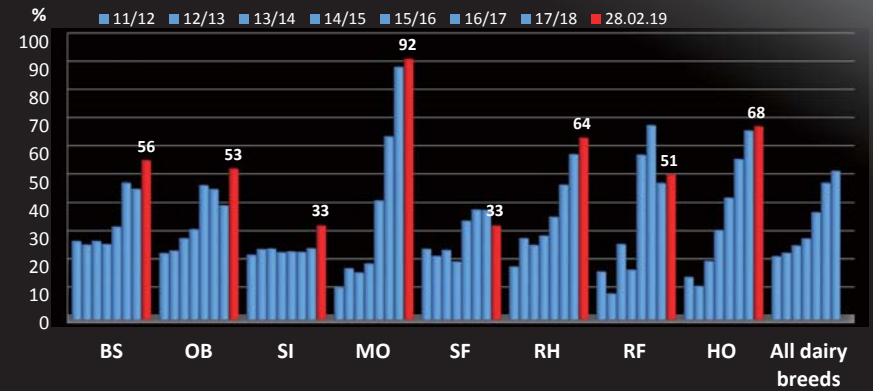
## Strategy in our genetic programs

- The Swiss breeder wants complete bulls, not extreme values
- Use of embryo technology to gain breeding progress
- Fast breeding progress in health traits
- Use best females for genetic development
- Worldwide best young bulls out of deep cow families to produce the next generation
- Fast production of sexed semen (seleXYon)

## Sampling bulls per year



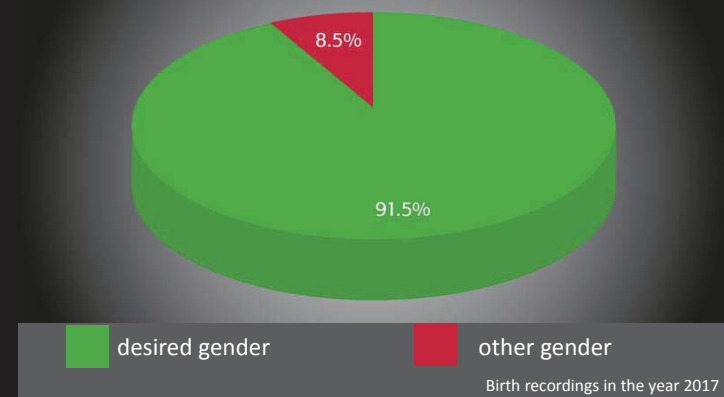
## Trust in young, genomically selected bulls is growing



## Sexed semen gains market share **selexyon**



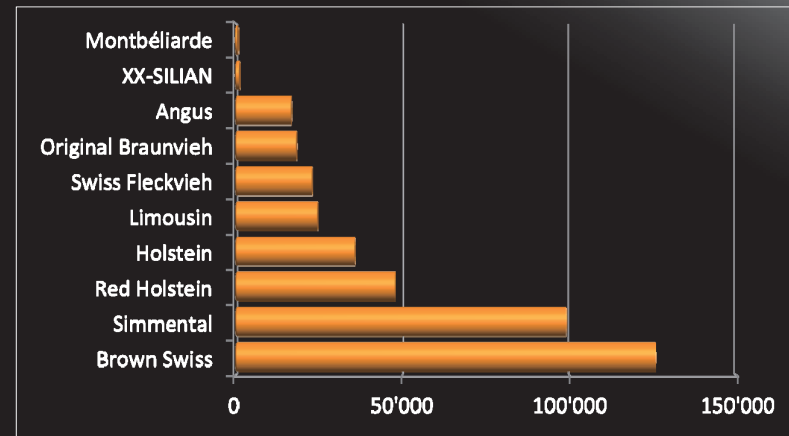
## Verified gender from seleXYon inseminations



## Swissgenetics exports semen to 69 countries – 2.5 shipments per week



## International sales per breed 2017/18 (semen units)



[www.breedoptimizer.com](http://www.breedoptimizer.com)

## Which breed fits your needs?

**The right breed is key to success**

Breed diversity offers a perfect solution for every breeding strategy. The choice of the right breed in the right production system is the key for long term and sustainable cattle production. Swiss cattle have been used for centuries all over the world, whether is it for milk, meat or dual purposes. According to the median temperature in your location and the feeding scheme at the farm level, the breed you need to develop the production is not always the same. Please use this breed optimizer to discover the optimal breed for you.

[Go To BreedOptimizer](#)

## Key points

1. Breed diversity offers the perfect solution for every breeding strategy and management
2. Genetics adapted to grassland has many advantages:
  - Self-sufficiency
  - Benefits animal and human health
  - Sustainable use of the land
3. Select the breed for your production environment



## Selecting cows for Automatic Milking Systems

Bulls breeding for Automatic Milking Systems (robotic system) are marked with a logo



Requirements, eg. for Holstein bulls:

Minimum breeding value for

- ✓ milkability (milk flow)
- ✓ teat length
- ✓ somatic cell count and
- ✓ milking temperament

## Our products hold what they promise ...

NORWIN - Junior Champion  
WDE 2018



O KALIBER - Intermediate  
Champion WDE 2018



Fredo SIMMENTAL  
European Champion 2018



LOTANIE - Red Impact Cow 2018



謝謝



THE GLOBAL STANDARD  
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

謝謝

Via Savoia 78, esc.A, int.3, piano 1  
I-00198 Rome, Italy  
tel. +39 - (0)685 127 231 / (0)685 237 237  
fax : +39 - (0)623 315 553  
[www.icar.org](http://www.icar.org)