



# Interbeef Activities and the Interbull Centre

Toine Roozen

Interbull Centre Director





# Interbull Centre

- **International Bull Evaluation Service**
- Established in 1995 at SLU, Department for Animal Breeding and Genetics (HGEN)
- Contract between SLU and International Committee for Animal Recording (ICAR)
- **Enabling importers and exporters to select, worldwide, the best genetics for different countries, environments or breeding goals**





# Interbull Centre

- International Genetic and Genomic evaluations
- Infrastructure and expertise for International Data Exchange and Quality Assurance:
  - Processes, Standards
  - Protocols, CoP
- Global Reach
  - 35 countries
  - 5 continents
- ISO certified





# Guiding Principles

Customer oriented

Accurate / Unbiased

Independent / Transparent

Integrity

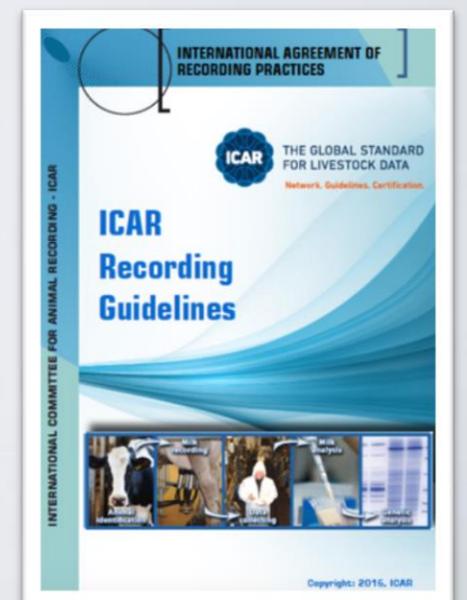
Cost effective

Innovative/Leading Edge Services



# Setting, and maintaining standards

- EU Animal Breeding Law: Regulation (EU) 2016/1012
- Interbull Centre is EU Reference Centre for Bovine Breeding
- Provide technical expertise to the Standing Committee on Zootechnics.
- ICAR Guidelines
- Animal Breeding and Evaluations
  - **Interbull International ID**
    - Unique ID world wide





# Quality Assurance & ISO standards

- **Quality Assurance (Data):** All data validated by customers and Interbull Centre staff before each evaluation via a set of in-house developed programs.
  - Primary key: Interbull ID (worldwide unique identifier)

**Breed country sex 12-digit number**

**SIM FRA M 000123456789**

- **ISO Standard (Processes)**
- Certified January 2016: Now ISO 9001-2015
- Zero non-conformities (3<sup>rd</sup> year in a row)!





# Interbull Centre

Interbull Centre Team: 4 IT staff; 5 Geneticists, 1 Director  
Additional support from Dept of Animal Breeding and Genetics





# Interbull Centre Infrastructure



- High priority for Security and Privacy:
- Firewalls, Security Enhanced Linux and Intrusion Detection Systems: integrated parts of entire infrastructure
- Privacy is protected; only users with right permission can access data that they are supposed to



# Interbull Centre Infrastructure

1. **Web interfaces** for users and staff to **Add, Modify and Display** data:
  - Interbull Data Exchange Area (“IDEA”)
  - International Genotype Exchange Platform (“GenoEx”)
2. **Database backend**: storing and processing of data in multiple - interacting – databases
3. **Calculating and Storage Cluster**:
  - Modular: Possibility to expand with increase in demand
  - Parallel, fast processing, large RAM
  - Storage cluster with multiple backup; connected with servers for persistent storage.



# Databases and Data at Interbull Centre

Platform	Database	Records	Breeds <sup>+</sup>	First use
<b>Interbull Data Exchange Area (IDEA)</b>	Pedigree data	35 340 746	64	2009
	EBVs	40 045 829	25	2013
	Performance data	40 969 517	13	2019
	Genetic Traits	22 534	1	2019
	Genotyped records for InterGenomics*	44 565	1	2014
<b>International Genotype Exchange Platform</b>	GenoEx-PSE: SNP Records for Parentage Verification	57 021	32	2019



# Interbeef Evaluations



- **Estimation of International Breeding Values for Beef bulls**
  - 5 Breeds: Aberdeen Angus, Charolais, Hereford, Limousine and Simmental
  - 3 Evaluations / year (2 routine + 1 test)
  - 3 Traits: Adjusted Weaning Weight, Calving Ease and Birth Weight



# Interbeef Evaluations



<b>Interbeef</b>	<b>Jan 2017</b>	<b>Jan 2018</b>	<b>Jan 2019</b>
Countries	7	7	9
Evaluation breeds	2	3	5
Country-breed-trait combinations	18	22	58
Animals in the pedigree database	28 256 603	29 965 798	35 109 302
Submitted phenotype records	7 890 490	8 234 838	40 734 117
International estimated breeding values	61 142 008	63 215 818	257 156 657
Distributed international estimated breeding values	1 344 841	1 407 786	6 805 936



# Interbeef Evaluations



<b>Interbeef</b>	<b>Jan 2017</b>	<b>Jan 2018</b>	<b>Jan 2019</b>
Countries	7	7	9
Evaluation breeds	2	3	5
Country-breed-trait combinations	18	22	58
Animals in the pedigree database	28 256 603	29 965 798	35 109 302
Submitted phenotype records	7 890 490	8 234 838	40 734 117
International estimated breeding values	61 142 008	63 215 818	257 156 657
Distributed international estimated breeding values	1 344 841	1 407 786	6 805 936



# International Data Exchange



- 'AnimInfo'
- 'GenoEx'
- Exchange with
  - National organisations
- Used by
  - National organisations
  - Breed Associations
- **For improved quality & additional info**
  - Animal information
  - Pedigree verification
  - Pedigree Certificates



# Interbeef Data Exchange



## 1 - Amongst Interbeef participants only

Multilateral exchange of information:

- Has the animal been genotyped?
- Can the genotype be shared?
- **NOT: actually genotypes**

## 2 – International Genotype Exchange Platform

Multilateral exchange of SNP data:

- 200 SNP for successful parentage verification



## GenoEx - Parentage SNP Exchange

- The main **purpose** of GenoEx-PSE is to provide a service for exchanging standardised sets of SNP for genotyped animals **to facilitate and streamline parentage analysis activities** carried out by organisations that are responsible and/or active in parentage integrity.
- **Parentage SNP Exchange:**
  - **200** SNPs for successful parentage verification



### **ICAR Accredited DNA Data Interpretation Centres**

is a pre-requisite for organisations joining the  
GenoEx-PSE

**20** accredited organisations.

**9** joined GenoEx-PSE:

Poland (**NRIAP**)

Norway(**GENO**)

Germany (**VIT, GAU**)

Italy (**ANAFI, ANAPRI, ANARB**)

Ireland (**ICBF, Weatherbys**)

Slovenia (**AIS, Univ. of Ljubljana**)

Denmark (**SEGES**)

Japan (**LIA**)

Switzerland (**QUALITAS**)

Austria (**ZuchtData**)

The Netherlands (**CRV**)

USA (**CDCB**)

Canada (**CDN**)

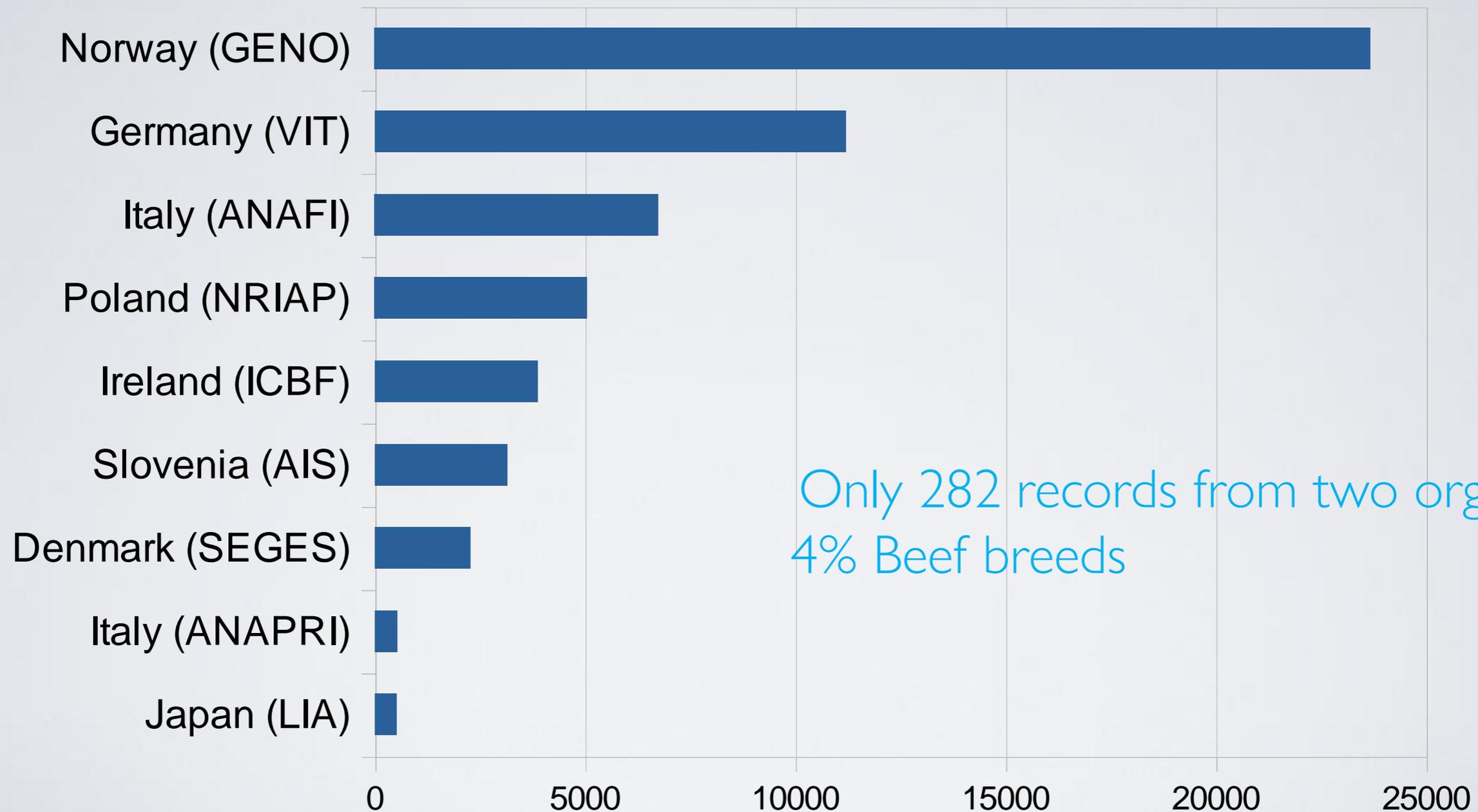
Sweden (**Växa**)

Finland (**Faba**)



# GenoEx-PSE: current data

**57021 records**  
= unique individual IDs

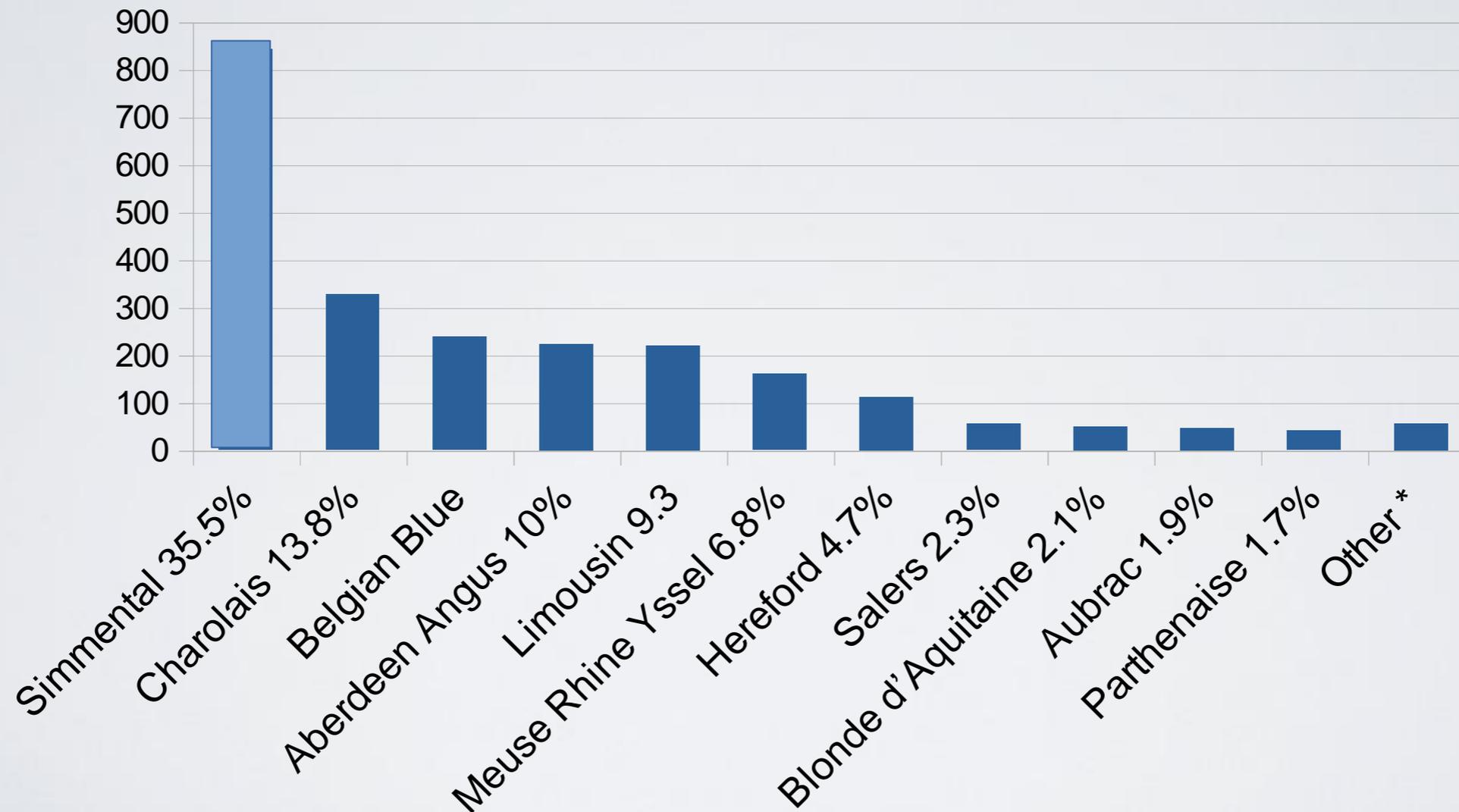


Only 282 records from two organisations  
4% Beef breeds



## GenoEx – PSE: Beef breeds

**2370** animals (out of 57021;  
4.2% of all data)  
100% males  
**98%** > 186 SNPs



\* Other breeds include: Piedmont (29), Dexter (13), Wagyu (5), Galloway (3), Highland Cattle (3), Rouge des Pres (2), Murray-Grey (1)



Thank you



Enabling importers and exporters to select, worldwide, the best genetics for different countries, environments or breeding goals.