Interbull Business Meeting

21 May 2024

Meeting 2

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

Interbull Business Meeting

Matthew Shaffer
Interbull Steering Committee Chair

THE GLOBAL STANDARD
FOR LIVESTOCK DATA


Welcome Back
2024 Interbull Business Meeting

House Keeping

- Please silence your mobile phones
- Please use the microphone and state your name
- Official Delegates, please sign your name on the paper

Business Meeting Delegates

Australia	Matthew Shaffer
Austria	Hermann Schwarzenbacher
Belgium	Alain Gillon
Canada	Brian Van Doormaal
Croatia	Marija Špehar
Czech Rep.	Jiri Splichal
Denmark	Gert Pedersen Aamand
Estonia	
Finland	Gert Pedersen Aamand
France	Laurent Journaux
Germany	Reinhard Reents
Hungary	Marija Klopčič
Ireland	Ross Evans
Israel	Yaniv Lavon
Italy	Johannes van Kaam
Japan	Takefumi Osawa
Latvia	Erna Galvanovska
Lithuania	Vytenis Čukauskas
Netherlands	Gerben de Jong
New Zealand	
Norway	Janez Jenko
Poland	Sebastian Mucha
Portugal	Adriana Pereira
Slovakia	Marija Klopčič
Slovenia	Marija Klopčič
South Africa	Bernice Mostert
South Korea	Chang-gwon Dang
Spain	Daniele Vicario
Sweden	Gert Pedersen Aamand
Switzerland	Urs Schnyder
United Kingdom	Raphael Mrode
Uruguay	Ezequiel Nicolazzi
USA	Ezequiel Nicolazzi

Business Meeting Agenda

1. Opening and welcome
2. Adoption of agenda
3. Acceptance of the minutes of the 2023 Interbull Business Meetings
4. ICAR Update
5. Interbull Strategic Plan
6. Interbull Governance
7. Interbull Centre Director’s Report - part 1
8. New Traits Pipeline
9. Business Funding Models Task Force
10. Interbull Centre Director’s Report - Part 2
11. Interbull Technical Committee / Research and Development
12. European Union Reference Centre
13. Other Matters and Open Discussion
14. Future Events
15. Close

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Interbull Business Meeting

Item 10: Interbull Centre Director’s Report – Part 2

Toine Roozen

Interbull Centre Services

EVALUATIONS

- MACE
- GMACE
- InterGenomics
- Interbeef

VALIDATION

- Conventional breeding values
- GEBV-test
- TMACE
- EURC validation

EXCHANGE

- GenoEx-PSE
- GenoEx-GDE
- Genetic traits

COLLABORATION

- PREPdb
- Interbull Bulletin
- Meetings, Workshops and Webinars
- International Guidelines

Interbull Evaluations

EVALUATIONS

MACE

GMACE

InterGenomics

Annually:
3 Official evaluations
2 Test evaluations

Trait group	Traits
Production *1995*	Yield: Milk, protein, fat
Conformation *1999*	Body condition (19) Locomotion (6) Udder (9)
Udder health *2001*	Somatic cell score, Mastitis
Longevity *2004*	Direct longevity
Calving *2005*	Direct and maternal calving ease (2) Direct and maternal stillbirth (2)
Fertility *2007*	Heifer conception, interval, Cow recycling, lactating cow ability to conceive
Workability *2008*	Milking speed, temperament

Breeds:

- Holstein
- Jersey
- Guernsey
- Red Dairy Cattle
- Brown Swiss
- Simmental

Countries:

- 34

Country-breed-trait combinations:

- 1985

Interbeef Evaluations

EVALUATIONS

- Based on phenotypes, not EBV's.
- Different models for each country

Interbeef

Annually:
2 Official evaluations
1 Test evaluation

Trait group	Traits
Adjusted Weaning Weight *2015*	Animal Weaning Weight
Calving Traits *2019*	Birth Weight Calving Ease - direct and maternal effects
Carcass traits *2023*	Carcass conformation Carcass fat Carcass weight

Breeds:

- Aberdeen Angus
- Limousin
- Charolais
- Hereford
- Simmental

Countries:

- 12

Country-breed-trait combinations:

- 112

Key challenges:

- International genomic evaluations
- Integration of International evaluations into National evaluations.

Data Exchange

NEED for Data Exchange

Accurate genetic information

- Across-border collaborations
- Legal requirements:
  - Import-Export
  - Animal Breeding Regulations
- Breeding Programs
- Genetic Evaluations

EXCHANGE

GenoEx-PSE

GenoEx-GDE

Genetic traits

Data Exchange – Bilateral

NEED for Data Exchange

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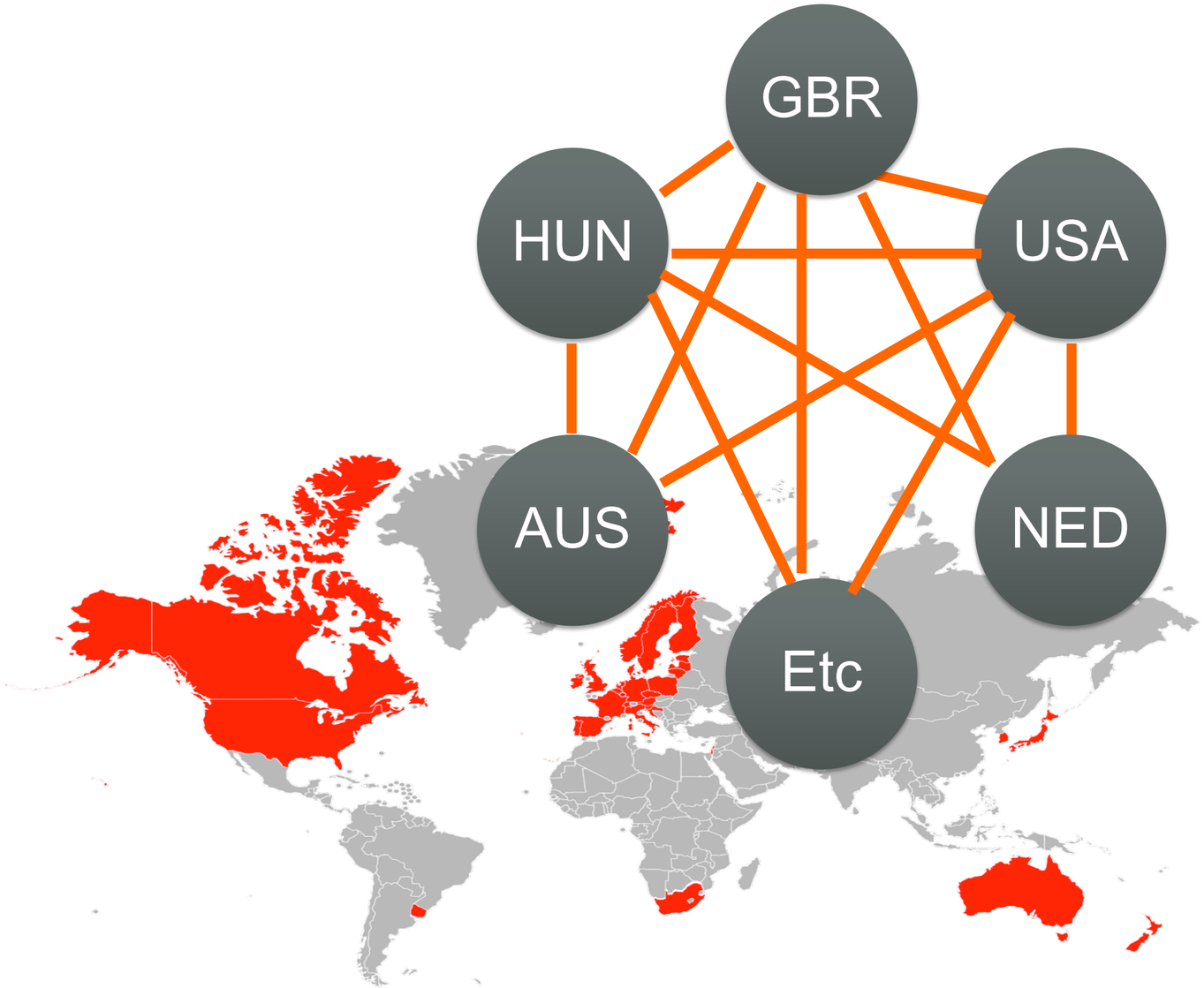

EXCHANGE

Data Exchange – Interbull DataHub

BENEFITS of INTERBULL DATAHUB

- **Facilitate** and **streamline** activities carried out by authorised Service Users
- **Get** information from foreign animals / **Provide** animal information to importing organisations
- Eliminate costs of duplication
  - Data Entry
  - Genotyping
- Greater transparency
  - In interest of breed
  - Often required by law

EXCHANGE

GenoEx-PSE

GENOEX Parentage SNP Exchange

SERVICE

- Parentage SNP Exchange (PSE) - SNP exchange only for parentage analysis
- Facilitates and streamlines parentage analysis activities carried out by authorised users of the service
- A defined set of SNPs can be exchanged:
  - Since 2018: **Parentage Verification** (“PV”) – 200 SNPs (recommended by ISAG)
  - **NEW in 2024: Parentage Discovery (“PD”) – 354 SNPs**
  - **ICAR DNA Data Interpretation Centre Certification required.**

KEY BENEFITS

- Access to parentage analysis genotypes for essentially all dams and AI sires and potentially missing genotypes for some sires
- Bull owners have more accurate identity of progeny in countries importing semen
- Eliminate costs of genotyping duplication

Webinar
April 2024

EXCHANGE

GenoEx-GDE

GENOEX Genomic Data Exchange

SERVICE

- **Enables full genotype exchanges** (whole SNP arrays) covering a variety of available genotyping chips
- **Users have full access** to their own genotypes plus genotypes obtained by exchange in the system
- **Each user of the service has full control** over which of their own genotypes it shares with other service users, and which of those service users
- **In use for InterGenomics – Brown Swiss and Holstein**

BENEFITS

- An easy and safe exchange of genotype data (performing quality and pedigree availability checks)
- Easy and standard for exchanging large genotype datasets
- Facilitates building reference populations
- Decreases costs by avoiding re-genotyping the same individuals
- Encourages development of genomic evaluations

EXCHANGE

Genetic Traits Exchange

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European Union Regulation 2016-2012:
Make publicly available the information on the genetic defects and genetic peculiarities of breeding animals which are related to the breeding programme.

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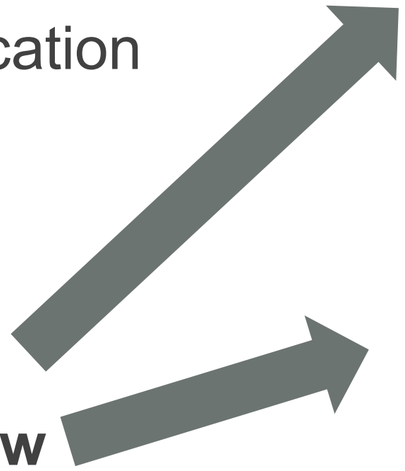

Request from WHFF (2016):
Service for exchanging gene test results

- Mainly undesirable genetic recessive traits
- Also favourable characteristics

- Holstein, 2019
  - Germany, Great Britain, Netherlands
- Brown Swiss, 2023
  - Switzerland, Italy, USA, Germany, Austria

European Union Regulation 2016-2012:

Make publicly available the information on the genetic defects and genetic peculiarities of breeding animals which are related to the breeding programme.

EXCHANGE

Genetic Traits Exchange - Value

2019

- Input = 230,000 records
- 100,000 unique animals
  - 95,000 ♂, 5,000 ♀
- Output = 265,000 records with genetic trait information
- Extra records:
  - vit, Germany: +13%
  - AHDB/SRUC, Great Britain: + 26%
  - CRV, Netherlands: +8%

EXCHANGE

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2024

- Input = **633 759** Holstein records
  - BLAD
  - Mule foot
  - DUMPS
  - CVM
  - Factor X1
  - CIT
  - Brachyspina
  - Polled (Current – Indirect Test)
  - Cholesterol Deficiency
  - Red
  - Black / red
  - Black
- **Traits approved by WHFF Council**

EXCHANGE

Genetic Traits Exchange – HOL

2024

Meetings with WHFF:

- Interest in participation from:
  - Holstein Canada
  - Prim'Holstein (France)
- Highlighting importance of protocols to timely introduce newly discovered genetic traits:
  - BLIRD
    - Bovine Lymphocyte Intestinal Retention Defect
  - Muscle Weakness
    - Early Onset Muscle Weakness Syndrome

2024

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EXCHANGE

Genetic Traits Exchange – BSW

Brown Swiss

- ASR, Switzerland
- ANARB, Italy
- Brown Swiss Cattle Breeders Association, USA
- BRS, Germany

2024

- Input = **159 141** Brown Swiss records
- Arachnomelia
- Beta-Casein
- Kappa-Casein
- Polledness
- Renal Dysplasia
- Spinal Dysmyelination (SDM)
- Spinal Muscular Atrophy (SMA)
- Bovine Progressive Degenerative Myeloencephalopathy (Weaver)

EXCHANGE

Genetic Traits Exchange

SERVICE

- Collection, exchange and conflict resolution of information on genetic traits
- Sharing of updated information regarding genetic traits
- Automated data exchange via the Interbull Data Exchange Area (“IDEA”)
- Distributed 3 times per year with official evaluations

BENEFITS

- **Identify** animals which are **carriers** of important genetic traits
- Allows an easier, safer and **more efficient exchange** of information on genetic traits
- **Consistency** of unique international animal ID is maintained **across countries**
- **Reduction in conflicting information**
- *Responsive to newly recognised traits*

Interbull Business Meeting

Item 10: Interbull Centre Director’s Report – Part 2

Toine Roozen

Interbull Business Meeting

Item 11. **Interbull Technical Committee** / Research and Development

Gerben de Jong

Latest Recommendations Approved (1/3)

The SC has recently approved of the following ITC recommendations:

- **Fertility Harmonization** https://interbull.org/ib/servicedocumentation
  - Use of “highly recommended” traits for the different Interbull traits
    - Increase countries’ correlations
  - ✓ If not available, considering using only of “accepted traits”

	Conception Rate (CR)	Pregnancy Rate (PR)#	Interval first-last insemination (FL)	Interval first insemination – conception (FC)	Number of inseminations (NI)	Non-return rate (NR)	Interval calving-first insemination (CF)	Days open (DO)	Calving interval (CI)
HCO	**		*	*	*	*			
CRC							**	*	*
CC1	**					**			
CC2		*	**	**	*			*	*
INT		**						**	**
** - highly recommended trait; * - accepted trait;									

#Pregnancy Rate to be used ONLY if the trait is clearly calculated as a function of Days Open (DO).

Latest Recommendations Approved (2/3)

➢ New GEBV-test Software

Full Data	Truncated Data
Conventional + Genomic (new file)	Conventional + Genomic

- ✓ Input files required:
- ✓ Official Interbull test based on VanRaden's de-regressed GEBV (2021 Interbull bulletin).
- ✓ Default base-adjustment for full/truncate EBV files
- ✓ De-regressed GEBV derived from 300Gf and 300Gr evaluations in the same way for all countries by the new software
  - ✓ De-regression method gets internationally standardized
- ✓ A Bootstrapping approach has been implemented instead of a t-test for testing the bias in validation slopes
- ✓ Program will be made available to users -> *To be officially introduced in August 2024*

Latest Recommendations Approved (3/3)

- **Genomic Reliabilities Guidelines** https://interbull.org/ib/servicedocumentation

The Genomic Reliability WG has worked on a set of guidelines regarding the estimation of the genomic reliability, in general, and the application of the Interbull method, in particular:

- ✓ **Guidelines for Approximating Genomic Reliabilities of the Single-Step Genomic Model**
- ✓ **Guidelines for Deriving Genomic Effective Daughter Contribution Gain**

Genomic Reliability Status Update

- Work on guidelines for evaluations with small reference populations
  - New traits
  - Small breeds

- Breed-specific genomic reliability adjustment in a multi-breed evaluation system.

Validation WG Status Update

- Revise interbull Test III so it can be used on young generation's bulls

- Test Mendelian Sampling Variance test to account for the mean of the MS term to deviate from zero (*under final testing*)
  - ✓ Applicable for situation with genomic selection

- Review biological limit applied in GEBVtest
  - ✓ Based on countries' experience on new GEBVtest software

Review of MACE Coding Status Update

- New working group, chaired by Raphael Mrode
  - ✓ Review current Type of Proofs coding
  - ✓ Assess needs for new coding in the genomic era
  - ✓ Provide guidelines on application of the coding

Review of Current Service Schedule

- New working group, chaired by Jan-Thijs van Kaam:

  - ✓ Provide a plan to create some more time between the MACE pre-release and the start of GMACE, without increasing the overall time of the evaluation
    - ✓ Latest MACE proofs could be used as input to GMACE
  - ✓ Provide a plan to reduce the overall evaluation time
    - ✓ Previous MACE proofs would be used as input to GMACE
  - ✓ Review the schedule and frequency of Truncated MACE (TMACE)
  - ✓ Explore possibility to allocate for an extra test run in May

International evaluations in genomics era (Future MACE working group)

Pete Sullivan (Lactanet, Canada)
Gerben deJong (CRV u.a., Netherlands)
Ismo Strandén (Luke, Finland)
Valentina Palucci (Interbull, Sweden)

Benefits of a new MACE system

1. Unbiased genetic trend in MACE proofs that are used for selection in some countries
2. Unbiased MACE proofs become directly comparable to national EBV and national GEBV of local bulls
3. Unbiased MACE proofs for input to national GEBV
4. Unbiased PA from MACE as input to GMACE

Status of Future MACE

August 2023 (Lyon meeting)

- Accounting for estimates of GPS effects on MS means:
  - Encouraging results from sensitivity studies with alternative shrinkage parameters
  - Parameters should be estimated for optimal MS mean adjustments
- Accounting for GPS effects on MS variances:
  - Methods are available but testing is in early stages
- Using GPS-MACE results within the GMACE evaluation:
  - Impacts on GMACE results should be checked with the final GPS-MACE model
  - Biggest improvements for national GEBV conversions to non-genomic countries

Status of Future MACE

May 2024 (Bled meeting)

- Accounting for estimates of GPS effects on MS means:
  - Encouraging results from sensitivity studies with alternative shrinkage parameters
  - Parameters should be estimated for optimal MS mean adjustments
- Accounting for GPS effects on MS variances:
  - Methods are available but testing is in early stages (MS versus ANIMAL model?)
- Using GPS-MACE results within the GMACE evaluation:
  - Impacts on GMACE results should be checked with the final GPS-MACE model
  - Biggest improvements for national GEBV conversions to non-genomic countries
- Implement GPS-MACE programs for a pilot run by ITBC

Improving GPS-MACE input data

May 2024 (Bled meeting)

- GPS-MACE works now, but it will be even better with new national EBV
  - National EBV without genotypes do not include GPS effects
    - ➢ True GPS effects are underestimated (but not zero) from the current national EBV
    - ➢ The underestimates are better than assuming no GPS effects at all
- Better inclusion of GPS effects in national EBV will increase the magnitudes of GPS effects estimated in GPS-MACE, but how do we do it?
    - ➢ Can a GPS-EBV model that is like GPS-MACE be used at the national level?
    - ➢ Can ssGEBV be partitioned to remove individual genotype effects but keep GPS?
    - ➢ Can a de-regressed ssGEBV be used instead of a de-regressed EBV?
    - ➢ A presented option from France at the 2024 meeting in Bled ***

Interbull Business Meeting

Item 11. **Interbull Technical Committee** / Research and Development

Gerben de Jong

Interbull Business Meeting

Item 11. Interbull Technical Committee / **Research and Development**

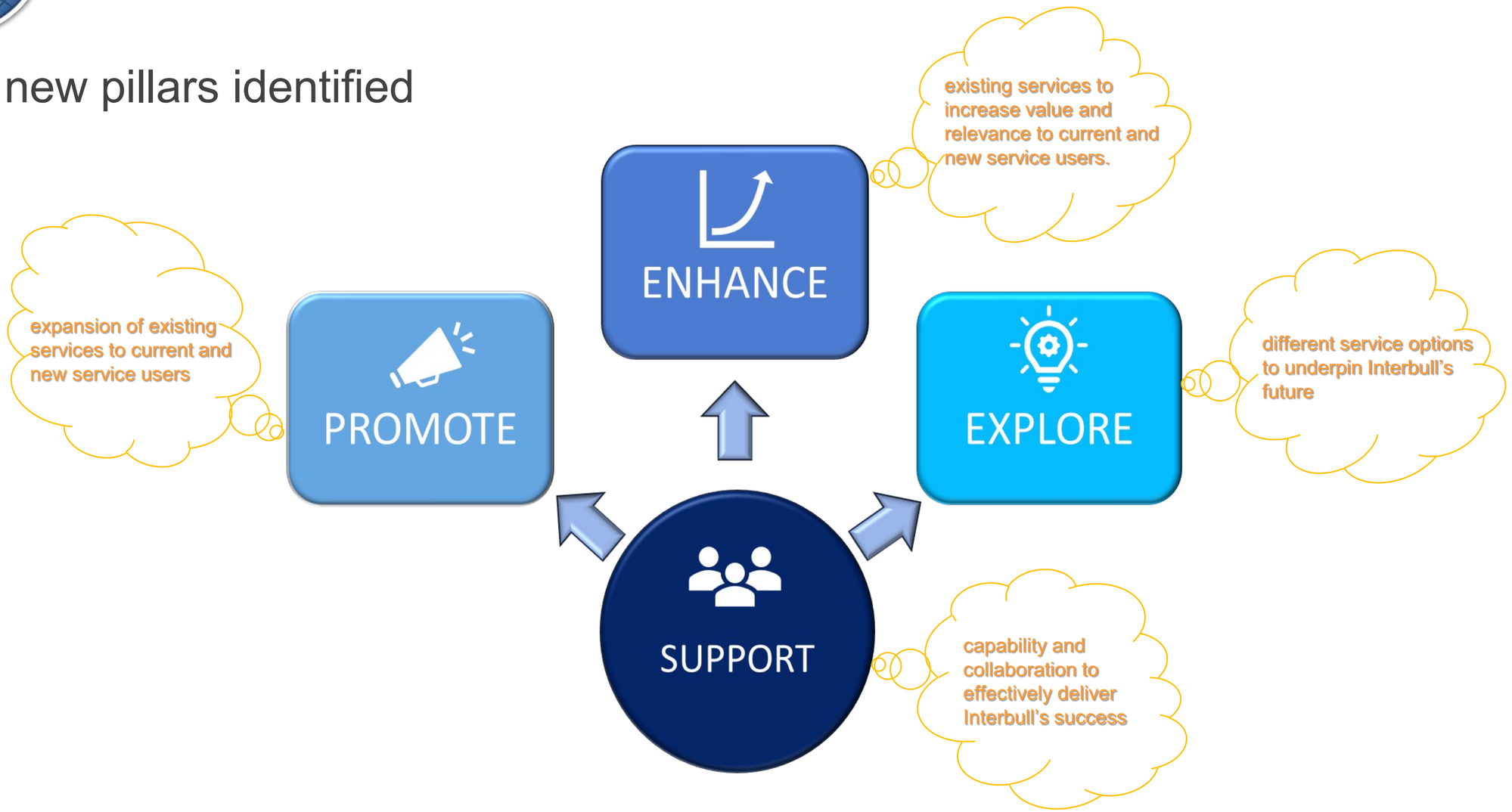
Valentina Palucci

Interbull Centre - Guiding Principles

- ✓ **Customer-Oriented** – we align our objectives around understanding and satisfying our customers' requirements.
- ✓ **Accurate** – we are committed to measurements and data being correct and precise.
- ✓ **Unbiased** – we work with an open mind and no bias.
- ✓ **Independent** – we make decisions and act in the best interests of the global Interbull network, not any individual organization.
- ✓ **Integrity** – we act with honesty and consistency in whatever we do.
- ✓ **Transparency** – we are committed to open, two–way communication.
- ✓ **Cost-Effective** – we strive to find the most cost-effective means for customers to achieve their goals.
- ✓ **Innovative and Leading-Edge Services** – we continually look for new and better ways of doing things.

New Strategic Plan

- Four new pillars identified



2024 Annual Operating Plan

PROMOTE

- Interbull Webinar's Series
  - GenoEx-PSE, GenoEx-GDE
- New webpage

- Increase awareness and participation to existing services

2024 Annual Operating Plan

ENHANCE

- New Traits
- Continue refinement of methodologies for ***dairy*** validation
  - New GEBVtest
  - MS test
- Develop of ***beef*** validation's methodologies
  - Developed an adjusted dairy method II for beef data
  - Continue developing new specific methods
- Improve beef VCE procedures
  - Standardize methodology and software -> aim to take it in-house
  - Provide clearer guidelines on when VCE is required

2024 Annual Operating Plan

EXPLORE

- GenoEx-GDE: Improve the user query extraction interface
  - Mark of mandatory fields, avoiding extraction to abort silently due to missing information
  - Extract animals with an updated sharing permission record
- GenoEx-GDE: for other species than cattle (multispecies)
  - Current development's plans for Horse and Sheep
- PREP
  - Inclusion of electronic forms for udder health, longevity, workability
  - Expansion to collect descriptive information for national genomic evaluations

Interbull Business Meeting

Item 11. Interbull Technical Committee / **Research and Development**

Valentina Palucci

Interbull Business Meeting

Item 12. European Union Reference Centre

Toine Roozen

EU Animal Breeding Regulation

EU Legislation 2016/2012

- Legal framework for the rules applicable to the breeding, trade and entry into the European Union of breeding animals and their germinal products; **cattle, pigs, sheep, goat and horses.**
- Applicable since 1 November 2018:
  - rules for the promotion of free trade in breeding animals and their germinal products
  - promote cross-border activities of breed societies
  - rules on official controls and activities
- Legal basis for official recognition of breeding organisations and for approval of their breeding programs

Implementing Regulations:

- European Union reference centre – Zootechnics (1 November 2018)
- European Union reference centre – Endangered Animal Breeds (1 January 2023)

European Union Reference Centre (EURC) for Zootechnics (Bovine Breeding)

Promotion of **harmonisation** or **improvement** of the methods of **performance testing** or **genetic evaluation.**

-Develop and improve standardised methods

-Create transparancy and assist with harmonisation

-Facilitate implementation

- Genomic Reliability *(Presentations by Zengting Liu/Gerben de Jong)*
- Interbull DataHub
- Validation methodologies
- PREP Database and ICAR-Interbull Guidelines

EU Animal Breeding Regulation

Breeding Organisations must *“make **publicly available** the information on the **genetic defects and genetic peculiarities** of breeding animals which are related to the breeding programme”*.

Interbull Centre does NOT publish such data, but **facilitates** easier transfer through the Interbull DataHub:

- “Genetic Traits Exchange”

EU Animal Breeding Regulation

Genetic Evaluation and Validation

AI Bulls must have a (g)EBV:

1. Genetic evaluation methodologies
2. Calculation of reliabilities

Minimum reliabilities:
50% (Dairy Bulls)
30% (Beef Bulls)

Genomically evaluated bulls:

1. Genomic evaluation method validated for each genomically evaluated trait;
2. All traits to be revalidated
3. **GEBVtest is valid for (max) two years**

……in accordance with EURC rules and standards.

Validation

One of Interbull Centre's /EURC's most important roles

- Develop, maintain and improve Validation Methodologies
- Testing national evaluation results for consistency
- Public recognition:
  - Independent assessment and quality assurance of (G)EBVs
  - Assurance that statistical models applied are sound and appropriate to the data → Reducing bias in data, increase quality.

Validation methods of national (G)EBVs

Conventional Validation

- 4 Validation tests available:
  - Trend Validation Tests (Methods I, II, III)
  - Mendelian Sampling Variance Test;
- Prerequisite for marketing/using progeny tested bulls in EU

Genomic Validation

- 1 test available: “GEBV-test”
- Prerequisite for marketing/using genomically tested bulls in EU

EURC Validation

- Independent validation of genetic evaluation models
- Available to **all** breeds and **all** European breeding organisations and NGECs
- *Population size may limit relevance of tests*

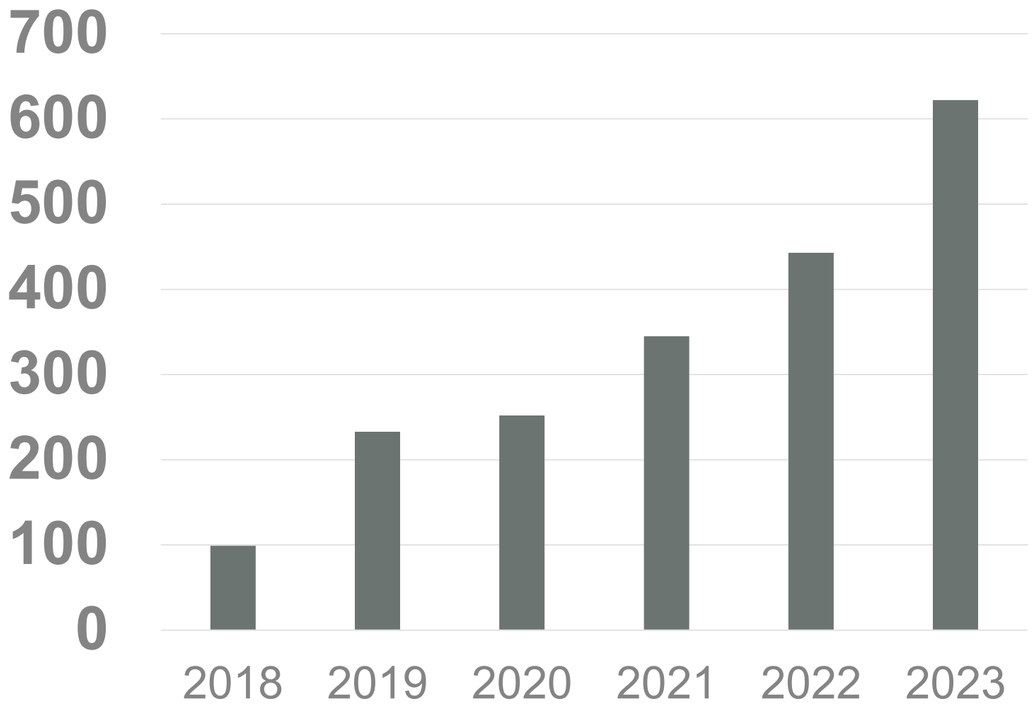
Beef Validation

- Under development
- *Challenging due to industry structure:*

  → Low AI, Small contemporary groups, fewer well proven bulls

Validation results – dairy

- International evaluations
- Total Number of Validations of national results, including:
  - Trend Validation Tests (Methods I, II, III);
  - Mendelian Sampling Variance Test;
  - GEBVtest

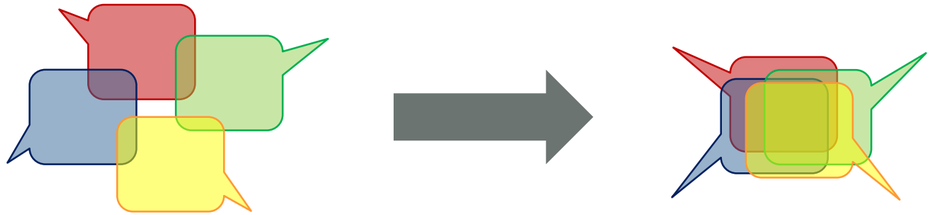


See Open Meeting – Anahit Nazari

PREPdb

- **P**erformance **R**ecording, **E**valuation and **P**ublication **D**ata**b**ase (**PREPdb**)
- A platform for breed societies and National Genetic Evaluation Centres to submit and **share descriptive information regarding performance recording, national genetic evaluation systems and publication policies** in a standardised way.
- Publicly accessible

- **Transparent:** collecting and sharing of information on a wide range of breeds and traits.
- **Harmonisation & standardisation**



- ICAR-Interbull **Guidelines:**
  - *Calving-2022, Fertility-2024*
- Identifying **Opportunities** and **Challenges** for **EURC** and **Interbull**

Interbull Business Meeting

Item 12. European Union Reference Centre

Toine Roozen

Interbull Business Meeting

Item 13: Other Matters and Open Discussion

Matthew Shaffer

Proposed timeline for introducing new trait groups

- Set up one working group per trait group – including participating organisations.
- Issue a data call for Claw Health traits in October 2024
- Preliminary review of trait definitions (Claw Health) by early December 2024
- Issue a data call for Metabolic traits in January 2025
- Preliminary correlations estimations for claw health traits by June 2025 (Annual meeting)
- Preliminary review of traits definitions (Metabolic Traits) by June 2025 (Annual meeting)

Other updates

- Patents
- Cyber-attacks

Interbull Business Meeting

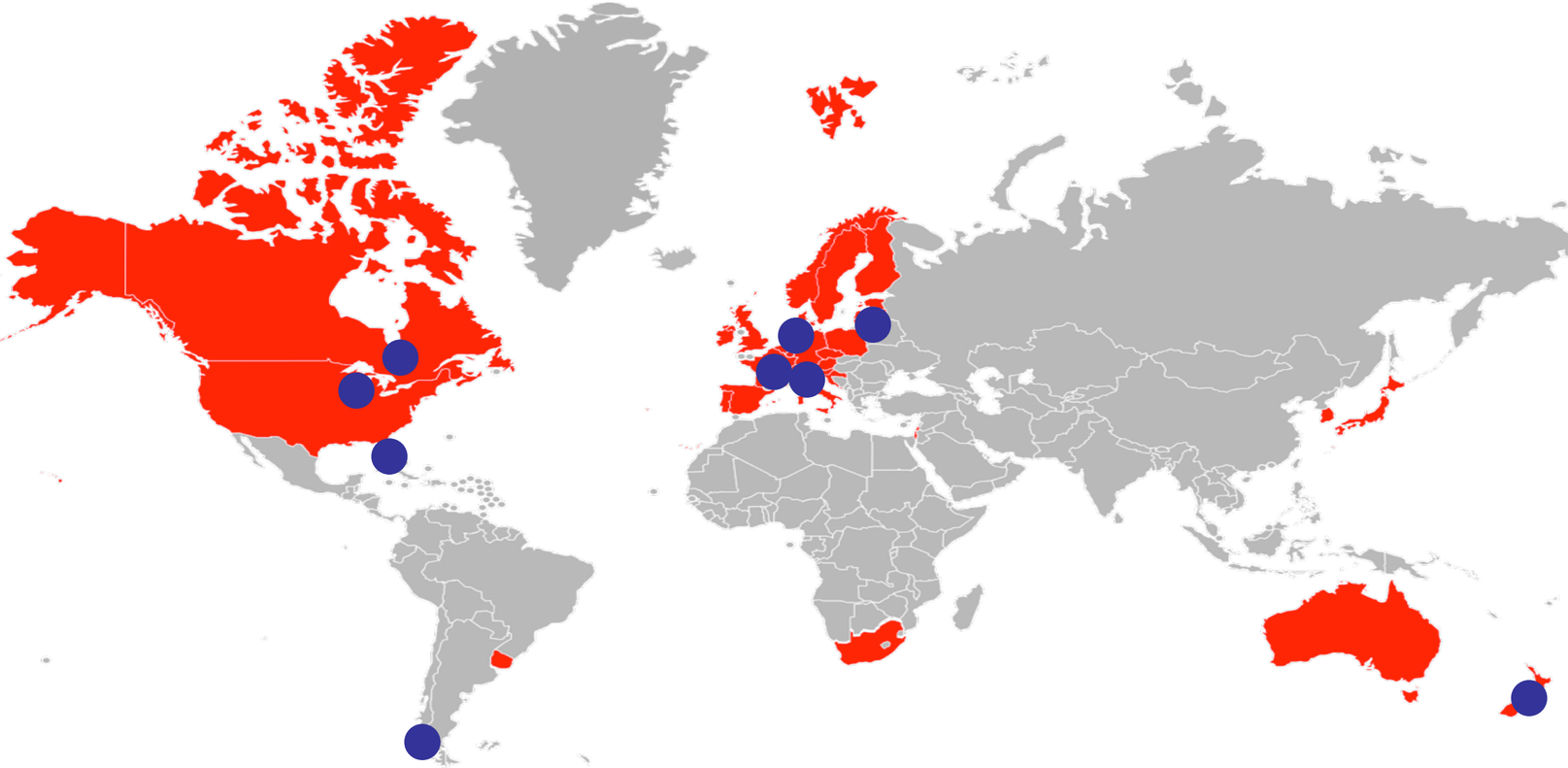
Item 14: Future Events

Matthew Shaffer

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

Interbull Annual Meetings



ICAR:

2024 – Bled, Slovenia
2022 – Montreal, Canada
2021 – Leeuwarden, Netherlands
2020 – Leeuwarden, Netherlands
2018 – Auckland, New Zealand
2016 – Puerto Varas, Chile

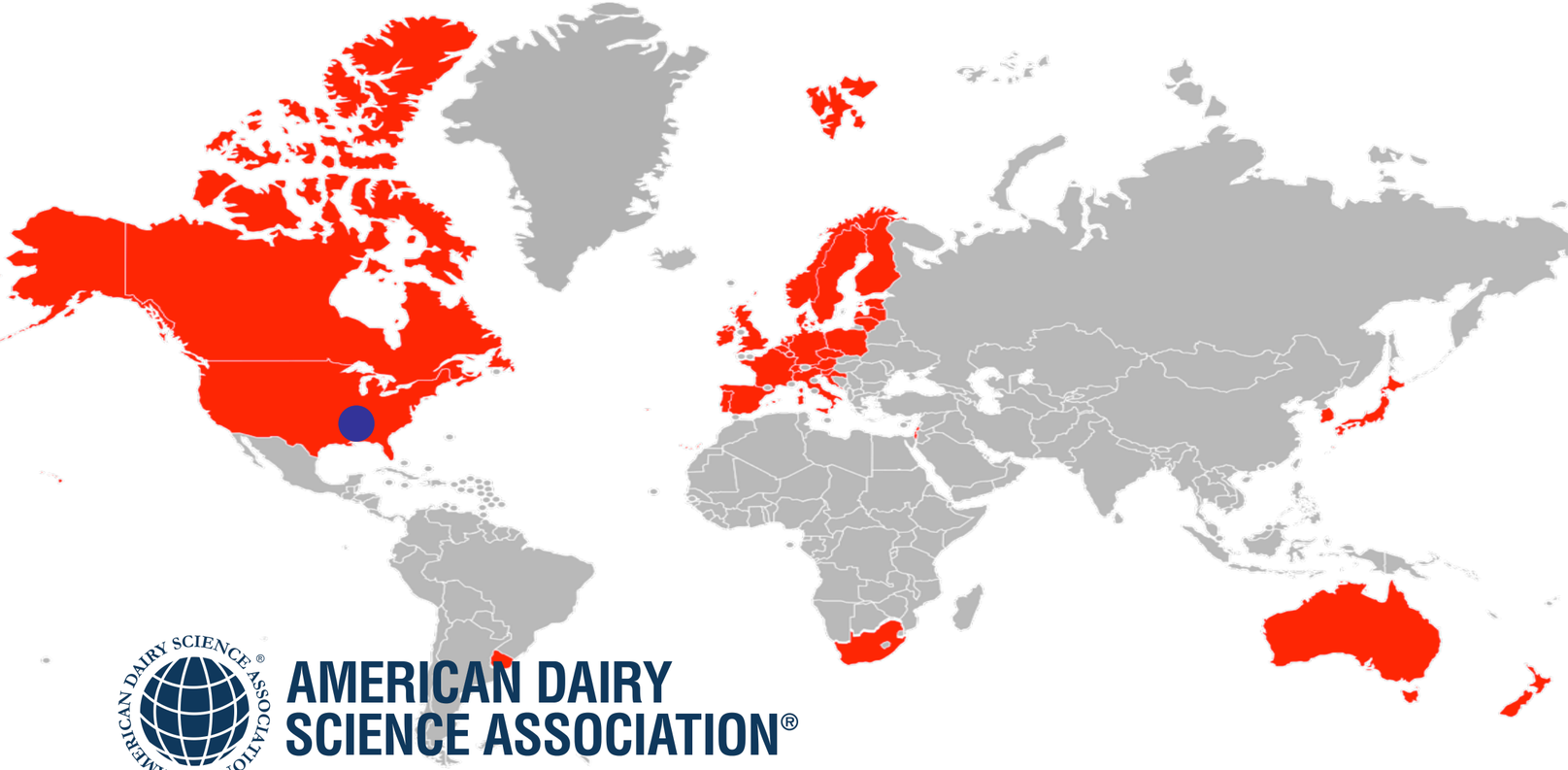
EAAP:

2023 – Lyon, France
2021 – Davos, Switzerland
2017 – Tallin, Estonia

ADSA:

2019 – Cincinnati, USA
2015 – Orlando, USA

Interbull Annual Meetings



ICAR:
2024 – Bled, Slovenia
2022 – Montreal, Canada
2021 – Leeuwarden, Netherlands
2020 – Leeuwarden, Netherlands
2018 – Auckland, New Zealand
2016 – Puerto Varas, Chile

EAAP:
2023 – Lyon, France
2021 – Davos, Switzerland
2017 – Tallin, Estonia

ADSA:
2019 – Cincinnati, USA
2015 – Orlando, USA

AMERICAN DAIRY SCIENCE ASSOCIATION®

Louisville, Kentucky, USA
21-23 June 2025: Interbull Annual Meeting
22-25 June 2025: ADSA Annual Meeting

Interbull Business Meeting

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Thank you!

Yvonne De Gier, Špela Pipan, Nina Bernard, Simone Hazas, Marija Klopcic, Marie Mourot

Interbull Business Meeting

Item 15: Close

Matthew Shaffer

THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.