Interbull New Services: Current & Future

Valentina Palucci
Interbull New Services

**EVALUATIONS**
- MACE
- Interbeef

**VALIDATION**
- GEBV-test
- EURC validation

**EXCHANGE**
- GenoEx-GDE
- GenoEx-PSE

**COLLABORATION**
- PREPdb

Genetic traits
EVALUATIONS
Genomic pre-selection (GPS) has altered the distributions of breeding values for AI bulls, because genomics made it possible to identify above average bulls within a family prior to progeny testing.

Before genomics, it was reasonable to assume within-family pre-selection was random in EBV models, but this assumption is no longer valid.

A working group was established in 2018, several reports have been produced during the past years with the latest developments towards a “Future MACE” implementation presented at the Interbull Technical Workshop in Rome.
The international MACE model was thus modified to account for non-random within-family GPS of AI bulls. The effects of GPS are estimated and included in the international EBV of sires in the new model: GPS-MACE. 

Sullivan et al. Interbull Bulletin no. 58. February 14 - 15 2023, Rome, Italy

✓ Further testing of the new model is planned during 2023/2024
✓ Aim for pilot run late 2024

➢ More information during the Business Meeting -> DO NOT MISS!
2021: New Trait Pipeline WG established:

- Identify key decision factors for implementing any traits
- Define infrastructure needed and programs/methodology
- Develop business model, business plan and appropriate fee structure

WG’s Take home message:

- Submit information on traits - not currently in Interbull’s portfolio - but of importance for your breed(s), using the dedicated PREP’s other traits online form.
### Most Promising Next Traits

#### Feed efficiency

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Legend:
- **Red** = High interest
- **Yellow** = Medium interest
- **Gray** = No information provided
- **Blue** = Low interest
- **I** = Evaluation implemented
- **D** = Evaluation under development

#### Claw-health related traits

### Next steps:
- Fill in PREP in relation to new traits identified
- Review of information
- Decision on how to proceed
BREED GROUPS

TRAIT GROUPS

- Adjusted Weaning Weight (AWW)
- Calving Traits:
  - Calving Ease (CAE) - direct and maternal
  - Birth Weight (BWT)

Carcass Traits:
- Carcass Conformation
- Carcass Fat
- Carcass Weight
VALIDATIONS
SERVICES

- Validation of national genomic breeding values that evaluates:
  - Unbiasedness - assessment of consistency of genetic trend captured by GEBV
  - Consistency of variation of GEBVs and EBVs
  - Improvement in accuracy from the use of GEBV instead of EBV
- Developed in the early genomic era, needed improvements to account for GPS

IMPROVEMENTS

- Option to make a base adjustment
- Options to allow use of different validation targets
- Option on using either weighted (WLS) or unweighted (OLS) least-squares regression tests.
- Adjustments for small populations
- Information regarding the power of the test
- Additional information to allow further analysis at national level (i.e. R² of base adjustment regression, validation test regression, mean difference …)
IMPROVEMENTS

- Software presented at the Interbull Technical Workshop in Rome
- Fine-tuned after feedback received
- Under final testing from selected countries
- Implementation aimed 2024

IMPROVEMENTS

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- Options to allow use of different validation targets
- Option on using either weighted (WLS) or unweighted (OLS) least-squares regression tests.
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EU Reference Centre (EURC) Validation

**SERVICE**

- Independent validation of genetic evaluation models using EURC Validation software
- Available to all European breeding organisations and NGECs even if not participating in an Interbull genetic evaluation

**BENEFITS**

- Covers all dairy breeds
- Inclusive to countries, organisations, populations and breeds that do not participate in international evaluations
- Assists with the harmonisation in methods and models between European countries
- Provides a “quality stamp” on conventional evaluation services as required by the EU for bulls advertised in the European market
## Genetic Traits Data Exchange

### SERVICE
- Collection, exchange and conflict resolution of information on genetic traits
- Sharing of updated information regarding recessive traits
- Automated data exchange via AnimInfo module within the Interbull Data Exchange Area ("IDEA")
- Distributed 3 times per year with official evaluations

### BENEFITS
- Identify animals which are carriers of important recessive traits
- Allows an easier, safer and more efficient exchange of information on genetic recessive traits
- Consistency of unique international animal ID is maintained across countries
- Reduction in conflicting information
- Responsive to new recessive traits
BREED GROUPS

Holstein-Friesian (Black & White / Red & White)

Brown Swiss

PREREQUISITES

- A genetic coding standard needs to be in place
- Information to be uploaded by NGEC
- For each animal with recessive genetic trait information to be submitted, pedigree records also need to be submitted
- MACE participation
- Service User Agreement with Interbull Centre

For expansion of this service to other breeds, please contact Interbull Centre
## Genetic Traits Data Exchange

<table>
<thead>
<tr>
<th>Holstein genetic traits</th>
<th>Brown Swiss genetic traits</th>
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<tbody>
<tr>
<td>BLAD</td>
<td>Arachnomelia</td>
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<tr>
<td>Mule foot</td>
<td>Beta-Casein</td>
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<tr>
<td>DUMPS</td>
<td>Kappa-Casein</td>
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<tr>
<td>CVM</td>
<td>Polledness</td>
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<td>Factor X1</td>
<td>Renal Dysplasia</td>
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<td>CIT</td>
<td>Spinal Dysmyelination</td>
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<td>Brachyspina</td>
<td>(SDM)</td>
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<td>Polled (Current – Indirect Test)</td>
<td>Spinal Muscular</td>
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<td>Atrophy (SMA)</td>
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<td>Bovine Progressive Degenerative Myeloencephalopathy (Weaver)</td>
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</tbody>
</table>
SERVICES

- Parentage SNP Exchange (PSE) - a 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:
  - Parentage Verification – 200 SNPs (recommended by ISAG)
  - Parentage Discovery – 354 SNPs

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
- Assists with transition from microsatellites to the use of SNPs for parentage verification
SERVICES

- 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

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
**BREED GROUPS**

- GenoEx-GDE covers all beef and dairy cattle breeds

- *GenoEx-GDE is in use by InterGenomics*
  - Extended to IG-HOL
  - Ready for other breeds

**PREREQUISITES**

- Existing participation in Interbull international genetic evaluations

- Service User Agreement with Interbull Centre
A big thank you to all WGs and WG members! 🤗

Interbull Centre will have a stand during the EAAP, come and visit us for more information!!!