The role of Interbull in the successful implementation of genomic selection in breeds other than Holstein

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10 years of genomics? OMG!
Other than HOL? Is there ANYTHING beside HOL?

YES.. in this case Brown Swiss
A case study on BSW... is it interesting?

- BSW is small compared to HOL
- Everything is small compared to HOL
- BIG countries for traditional traits are often SMALL countries for novel traits
- BSW used an innovative approach
- Everyone could be potentially interested in BSW as a case study
- ...even HOL...
The introduction of genomics as a new technology
A challenge: the «New opportunities old inequalities paradox»

• Is the new technology helping to improve ALL populations?

• Or is it only a tool to increase (even more) commercial competition in the major breed(s)?

• Who has more receives more?
  • Large numbers more opportunities
• new technology is introduced to either qualitatively improve the current functionality of products, or to enable new functionality that has not been possible before (Panu Korhonen, 2018)
The ideal scenario

- to exploit fully the new technology introducing new functionalities:
BUT

• quadrant D is likely to be relatively small compared to the existing product functionality and technology.

• If you use your technology development to improve many or all of your current features, you will have a lot more leverage for the technology

• Plan wisely and don’t leave your customers behind.
What happened in Cattle breeding schemes

• First : the improvement of known functionalities (a «Turbo» mode for traditional AIPT schemes)

• Second: the exploitation of new functionalities (Single steps, repro technologies sinergy, novel traits, mixed ref populations..)
First step: introducing the new technology
The «new» approach

- No more mendelian approach as in QTL detection or MAS
- A quantitative approach instead
- Expensive genotype analysis made on males only
- No real phenotypes on males..
- EBV used as proxy for phenotypes in reference populations
Size matters: the “5000” rule of thumb
Talking about «size»: a brief digression

Almost everyone is «small» with regards to new traits.

Big is not anymore a function of «traditional traits» recorded cows.

Breeders driven organization should take advantage of the international environment we are used to work in.
BSW favourable conditions

- No dominant player
- Strong international framework
  - EBSF ([www.brown-swiss.org](http://www.brown-swiss.org))
- The role of breeders
  - The sake of the breed
  - Not only market
The international framework
A little history

ITB task force works in 2008

Task force reports in Uppsala in 2009

Different scenarios
• One of which is ambitious and foresee someone having access to all genotypes

First BS international meetings in 2009

Development of Intergenomics in 2010 with INTERBULL

First stable run in 2011
Why Interbull?

• Independent
• Trusted
• Reliable

• And willing to play!
The role of Interbull

- Not easy to decide from an Interbull perspective
- The critical points
  - Interbull as a possible threat to Genetic Evaluation Units
  - Interbull not having enough experience in the field
    - (not completely different from point above)
  - Interbull doing «new» things not included in the traditional business model
    - (not completely different from the future challenges)
  - Interbull exposing itself as a provider of a final product (GEBVs)
Why it was good FOR Interbull

- Experience
- Competence
- Relevant in the genomic era

A Clear message of willingness to explore new models/systems
Very similar to the present situation and SNPMACE
Genotypes accessible to INTERBULL ONLY

No «sharing», but a common pool

Unique computation of GEBVs at international level
Structure and rules

8 Countries

A Management Committee

A Technical Committee

Interbull part of both committees

A system developed together
From Theory to Practice

- Candidate vs Reference populations
- Used to be: MOST Reference sires and SOME candidates
- The green bars are getting more and more important
- And we are talking about males only.
The impact of an agreement

- Thickness of the bar is proportional to the total number of candidates
- Ratio between RED and GREEN is how strong selection is in BSW breed all over the world
- The genomic era in BSW starts with Intergenomics project

Intergenomics agreement signed
Genetic trends PROTEIN

- As soon as selection pressure increases the trends for culled and selected bulls start to split
- Different countries are pushing on specific traits with different speed
Genetic trends

TYPE
• Sharing of genotypes
• Different calculation methods
• Interbull needs to redefine its role
  • A platform for sharing genotypes is a **VERY** limited role
The future in now

- A new double paradigm
  - From Males to Females
  - From Genotypes sharing to Phenotype sharing
  - InterPhenomics?
A crossroad for the whole industry

- Systems based on males (only) are solid but are the past
- The need of new traits is growing
- New traits are often costly to collect and have low $h^2$
- Building « phenotypes » via genetic evaluation of males is not efficient
- Real phenotypes are the ones to be used for new traits calibration
  - Reference populations of females (also)
A crossroad for Interbull

• Concentrate on back office
  • MACE until male paradigm holds
  • Certification
  • Sharing support

• Get into the future
  • Females are the future: Intercow? 😊
  • The need of a new business model
  • Sharing of phenotypes might be the next challenge
Lessons learned

• Clear governance:
  • nothing happens if not governed
• Mutual trust:
  • No way to work together if you do not trust others
• A vision from both ends:
  • The ability to see beyond what is needed in 1 or 2 years.
• Successive goals:
  • When you reach a goal use it a starting point for the next step
Interbull role: conclusions

W/O INTERBULL INTERGENOMICS WOULD NEVER HAVE HAPPENED

INDEPENDENCE IS THE KEY FACTOR
Thanks a Latte