

2014

IDF/ISO Analytical Week and
ICAR/INTERBULL Conference



How to select foreign young bulls when no domestic information is available?

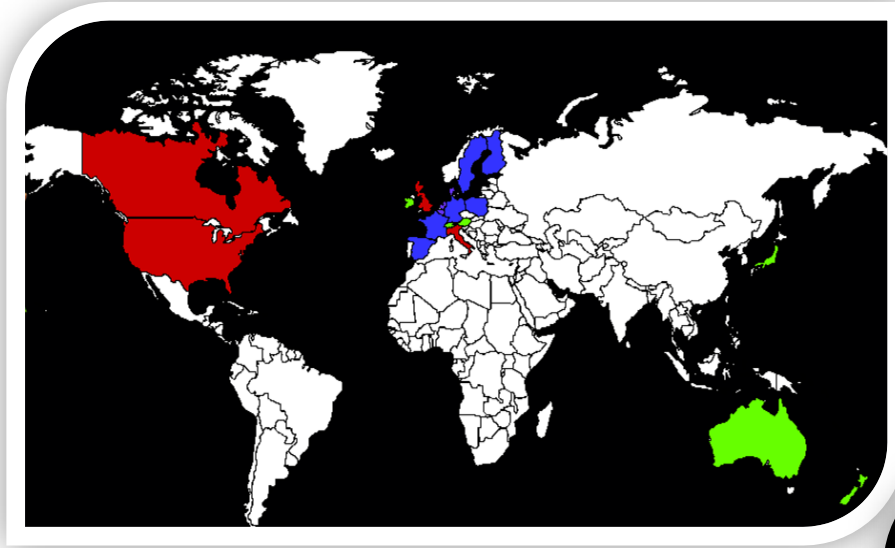





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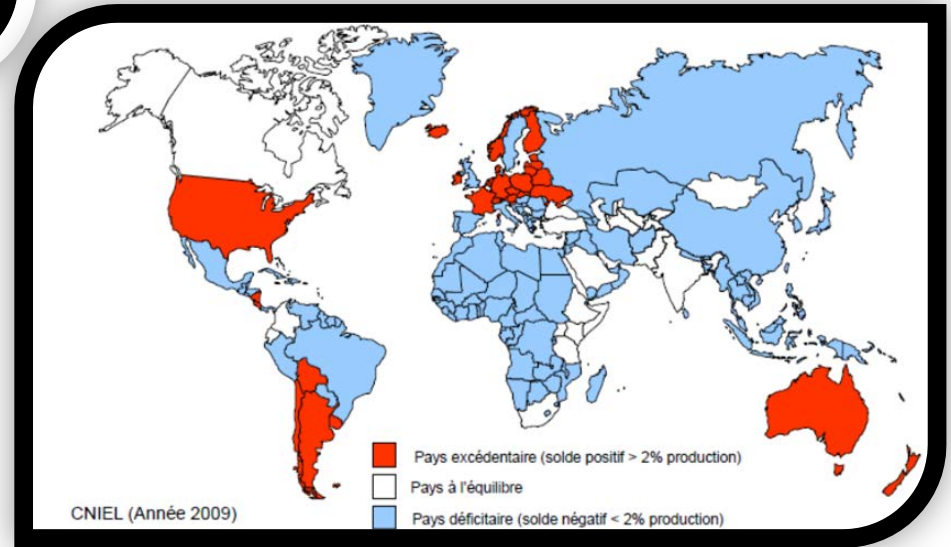
20/05/14

The genomic era: new contrasts



-  North-American consortium
-  EuroGenomics consortium
-  Other countries implementing GS

- Surplus 
- Balance 
- Deficit 



« GenoSouth » project

- Increased genetic progress in countries with GS
- Gap between North and South is becoming bigger and bigger

⇒ **How to take advantage of genomic tools?**

- Collaboration between INRA and large emerging countries:
 - Opportunities on the long-term?
 - Opportunities on the short-term?



Information available for a breeding scheme

4 country cases:

Cases	Domestic scale		Foreign scale
	Domestic sires	Foreign sires	
1	EBV + GEBV	MACE + GMACE	EBV + GEBV
2	EBV	MACE	EBV + GEBV
3	EBV	none	EBV + GEBV
4	none	none	EBV + GEBV

Interbull members:

1. with GS
2. without GS

Outside Interbull:

3. Genetic evaluations
4. No genetic evaluations



Aim of the study

- Measuring the consequences on genetic progress regarding contrasted levels of information:

Interbull members:

1. with GS
2. without GS

Outside Interbull:

3. Genetic evaluations
4. No genetic evaluations

⇒ 4 scenarios to mimic selection choices



How to mimic selection choices

- Based on all breeding values available on the French scale:
 - National evaluations (EBV, GEBV)
 - International evaluations (MACE, GMACE)
 - Data transmitted to France/available in France on Foreign scales
- Then, cut off data according to country case
- Focus on:
 - Candidate bulls born between 2003 and June 2012
 - The 30 best animals on :
 - **Production** => INEL

$$\text{INEL} = 0.98 * (0.2 * \text{Fat yield} + \text{Protein yield} + 0.5 * \text{Fat content} + \text{Protein content})$$

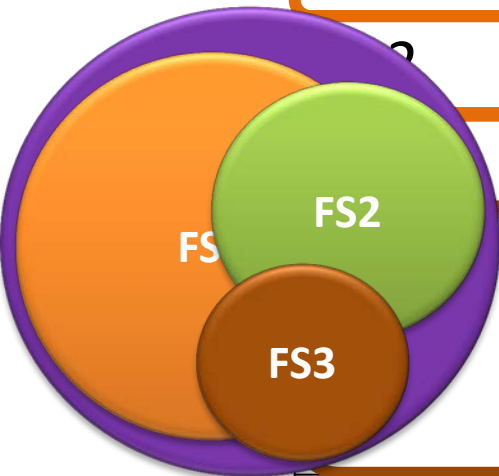
- Average of the genetic level, composition of the population



Holstein bulls with breeding values

On the FRA scale: with value at least for Milk production and $R^2 > 50$

Cases	Production (INEL)	Fertility	Udder health
1	51,617	31,077	32,238
2	40,472	21,899	27,049
3	4,551	4,099	3,727
FS1	46,233	31,010	30,903
FS2	28,452	-	-
FS3	13,721	-	-



*Domestic + Foreign bulls:
with & without progeny*

*Domestic + Foreign bulls:
with & without progeny*

*Only Domestic bulls:
with progeny only*

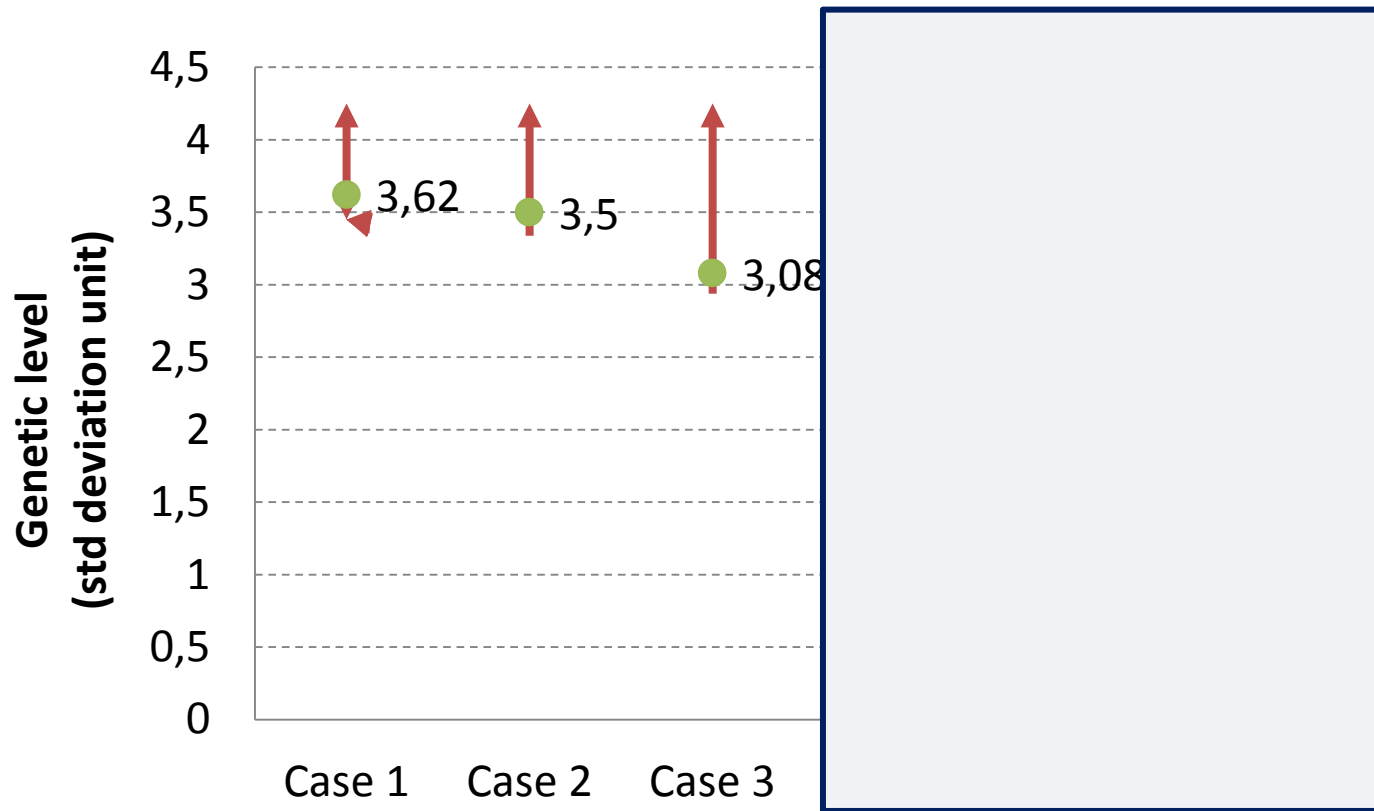
*Only Foreign bulls:
with & without progeny*

FS = foreign scale

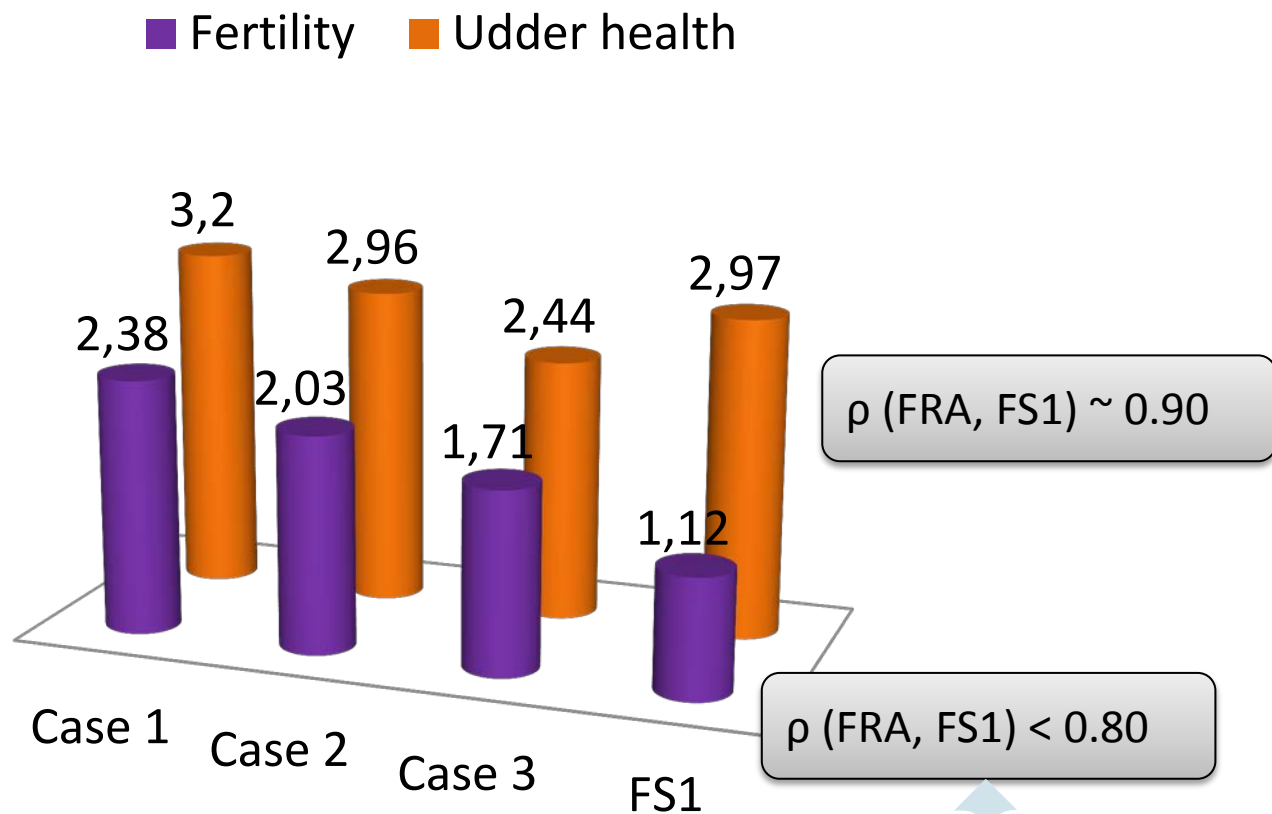


The best 30 bulls on Production

- Average genetic level of the top 30 bulls and range (min, max):



The best 30 bulls on functional traits



Average genetic level
(in genetic standard deviation)



Fertility: despite the availability of young bulls GEBV on FS1, the average genetic level on the national scale significantly dropped relative to case1 .



Conclusion (1)

- The highest genetic gain can be expected:
 - With the largest pool of candidates: foreign + domestic
 - With the youngest pool of candidates: including genomically selected bulls
 - ⇒ In spite of domestic GE, there is a big gap between countries member of Interbull and the others
- Long procedures:
 - To implement GE
 - To be part of Interbull : 1/ selection choice + 2/ access to a large RP
 - To implement GS
- On the short-term:
 - Very tempting to look at foreign scales
 - ⇒ Avoid broadening the gap, allow genetic improvement (genetic level, genetic diversity)



Conclusion (2)

- Looking at foreign scales:
 - Can be hazardous for traits with low genetic correlations at the international level
 - Gathering, interpreting and comparing (G)EBV from different foreign scales requires expertise
 - No information on the local genetics and way to improve it
- ⇒ Not a solution on the long-term!
- ⇒ Looking at foreign scale should not prevent from investing efforts in genomic evaluations on the most relevant scale, i.e., the domestic scale
- ⇒ A need for support from the countries with GS



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Thank you for your
attention

