

Multiple Across Country Evaluation - MACE

- A method for joint evaluation of breeding animals from two or more countries across countries
 - all animals ranked on the scale of each country
 - allows correct selection of breeding animals across countries
- Experiences from dairy cattle breeding through Interbull
- Is that something for the horse studbooks?



Globalisation of dairy cattle breeding programs



- Semen and embryos available on world market of many breeds for many years
- Market forces very strong but gave no advice on what is best for individual countries
- Breeding values not comparable across countries
- Farmers and AI studs need objective information and breeding values comparable across countries
- Interbull evaluations developed for this purpose

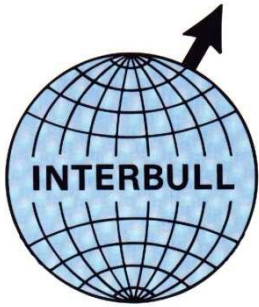
Percentage of progeny tested bulls with foreign sire

Breed group	Birth year of bull		
	1981-1985	1986-1990	1991-1995
Brown Swiss	67.3	57.4	64.9
Guernsey	14.6	13.0	32.7
Holstein		60.2	59.4
Jersey	14.9	26.1	35.0
Red Dairy Cattle	16.7	27.1	26.9
Simmental	23.6	26.0	28.6



Milestones

- 1975 EAAP and IDF working groups
- 1983 Interbull committee founded
- 1988 Permanent subcommittee of ICAR
- 1991 Interbull Centre established
- 1994 1st routine international evaluation (production)
- 1996 Official reference lab of EU
- 2005 10 years Interbull evaluations celebrated during annual meeting in Uppsala
- 2009 Moving into genomic evaluations



Size of Operation

Breed	No. bulls	No. populations
RDC	12 016	11
BSW	7 707	9
GUE	927	6
HOL	101 742	25
JER	8 058	10
SIM	21 315	10

Production traits April 2008



Participation rate – routine evaluations No. of bull populations – April 2008

Breed	Production	Conformation	Udder health	Calving traits	Longevity	Female fertility
RDC	11	8	10	5	9	6
BSW	9	7	8	4	6	5
GUE	6	4	5		5	4
HOL	25	21	23	9	19	16
JER	10	9	8		7	5
SIM	10		8		2	2

No. Pop.

71

49

62

18

48

38



Interbull Objectives

Non-profit organization

- Communication:
 - Meetings
 - Workshops
 - Publications
 - Homepage
- Conduct R&D
- Technology support to members
- ***International genetic evaluations***

Multiple-trait Across Country Evaluation (MACE)

Combines

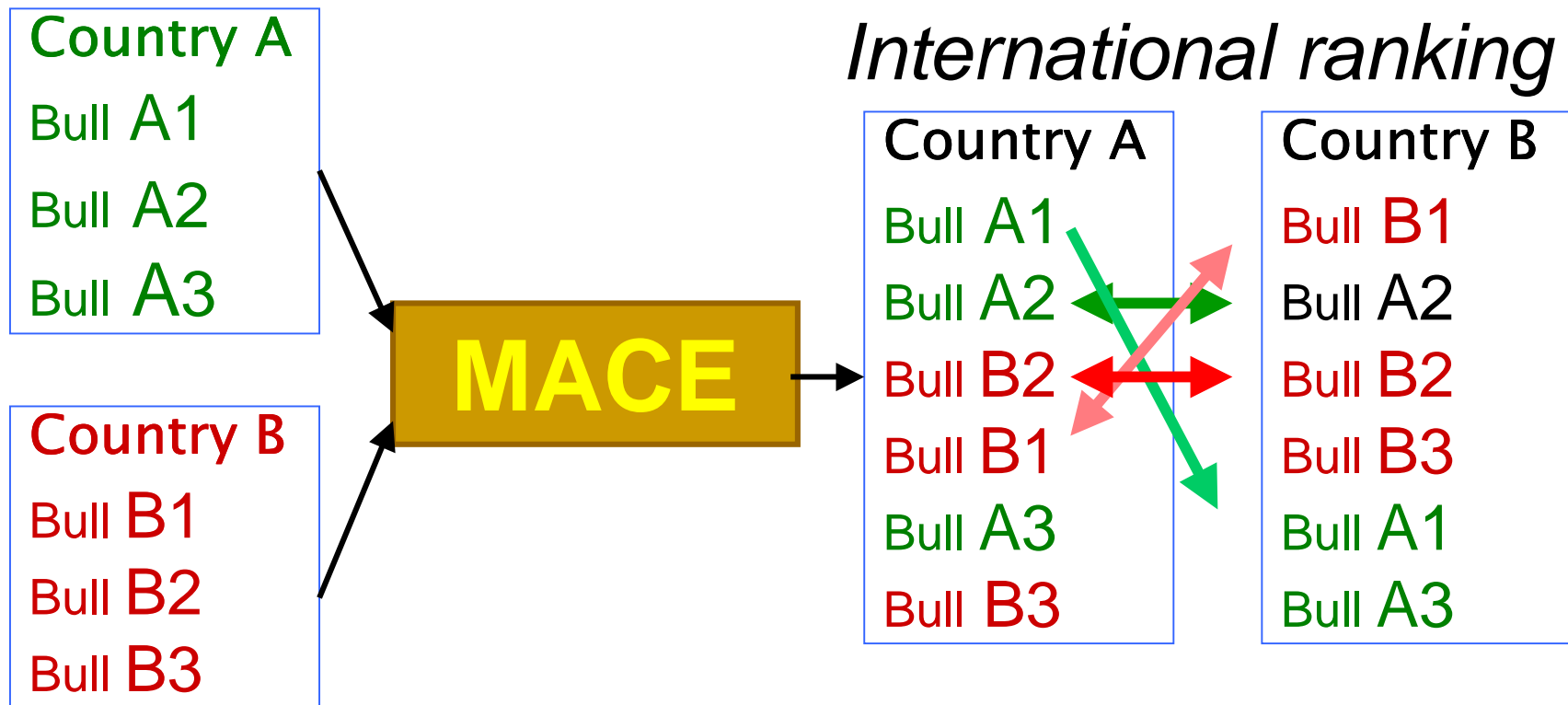
Domestic Pedigree Index

(Domestic Progeny Information)

Foreign Progeny Information

in the optimal way (BLUP)

MACE visualised



Re-ranking takes place because the genetic correlation between the results in country A and B is less than 1

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■ Assumptions

- genetic connectedness between the breeds/studbooks (the same stallions used or have sons in several countries)
- genetic correlations between countries high (>0.7)
- Internationally unique ID-numbers of all horses and complete pedigrees of both domestic and foreign horses
- EBVs (de-regressed) of national BLUP-Animal Model used and validated - unbiased results by analysing genetic trends
- agreements between participating countries on data delivery, publication rules, finances, property rights etc

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- Is MACE something for the horse studbooks?
 - or just pooling the phenotypic performance data for joint analysis and estimation of breeding values?
- Research projects needed to try out the methods and testing data quality including pedigree completeness and correlations between national and international EBVs
- The most important information for practical purposes is anyway knowledge about the genetic correlations between results obtained in different countries
 - same or different traits evaluated and selected for?
 - but MACE necessary to consider different genetic levels!