International genetic evaluations of fertility traits considering more than one trait per country

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Outline

1. **Introduction**
2. **Structure of the analyses**
3. **The choice of traits and changes of international evaluations**
4. **The reasons of changes**
5. **Results**
6. **Conclusion**

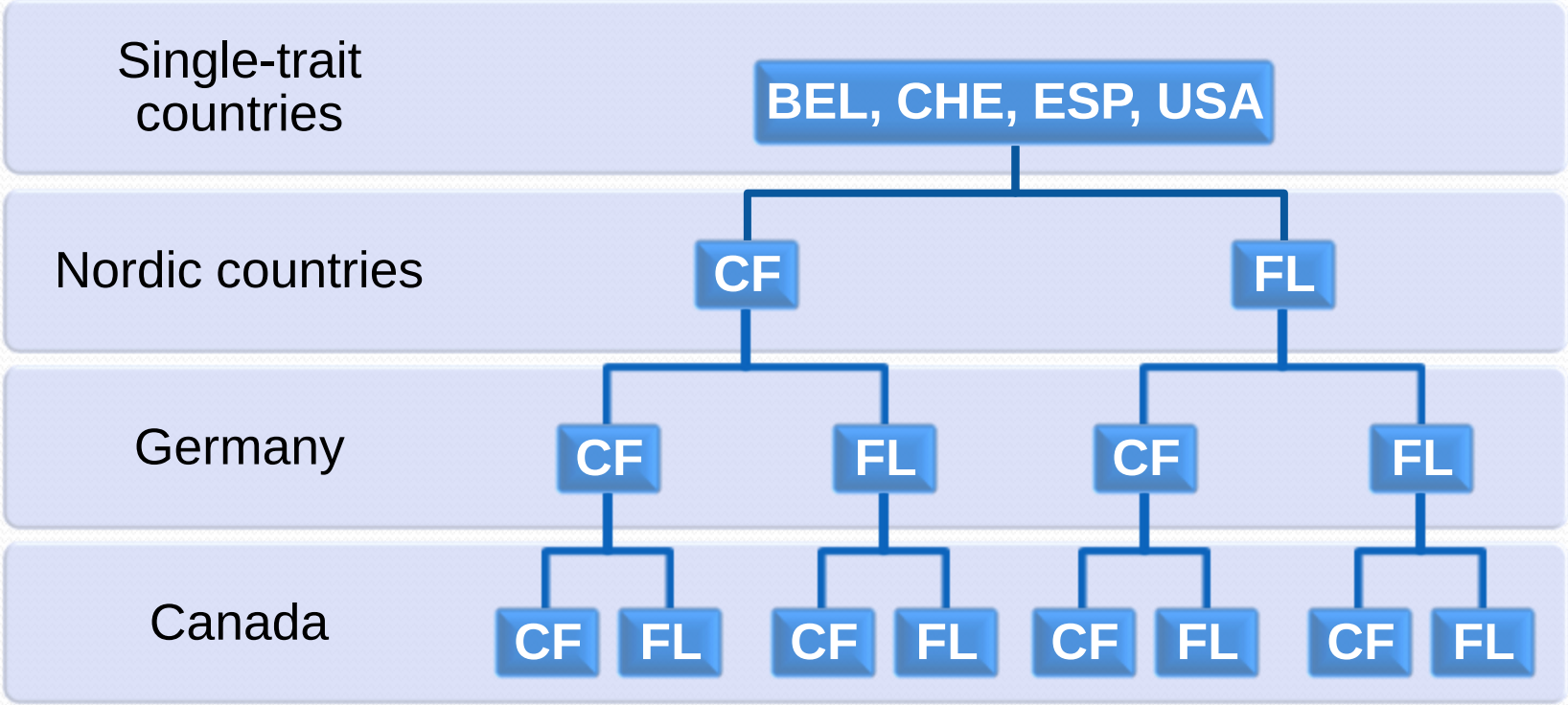
Methods

- National genetic evaluation systems alone cannot be very efficient without an international genetic evaluation system
- ST-MACE (Schaeffer, 1994) is the current method of evaluation in use in Interbull centre
- No residual covariances among daughter groups
- Multiple measures are available for some biological traits
- MT-MACE is proposed by Schaeffer (2001); it can handle non-zero residual covariances among country-traits

Past experiences

- MT-MACE in simulation study (Sullivan et al., 2005)
- MT-MACE tested on field data (Mark and Sullivan, 2006)
- Jorjani (2006) studied female fertility traits having multiple data from some countries
- The aim of this study is to find the effect of including more than one trait from a country in a well established methodology (ST-MACE)

Structure of the analyses



BEL (DO); CHE (CF); ESP (DO); USA (DO)

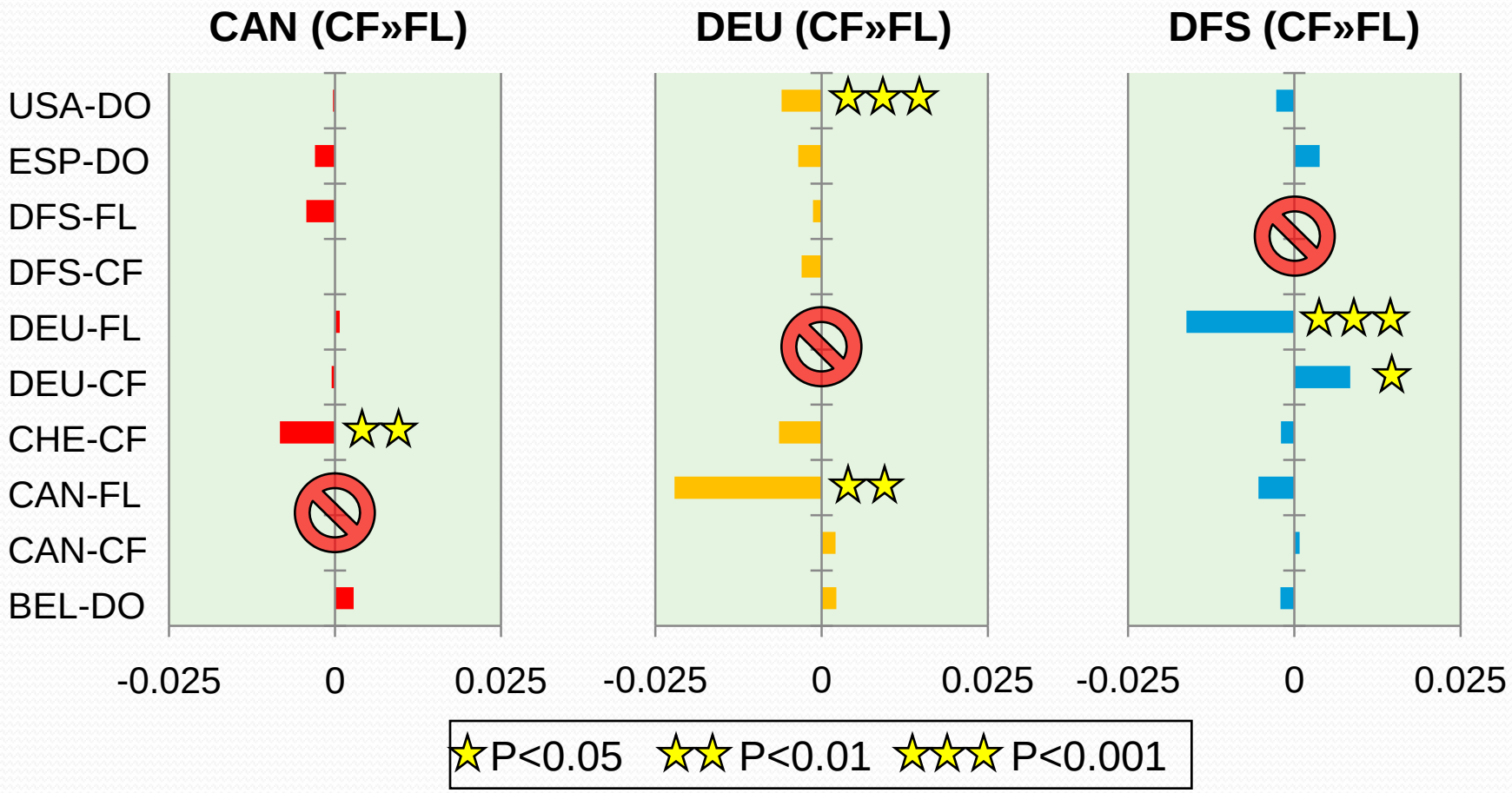
DO= Days open

CF= Calving to first service

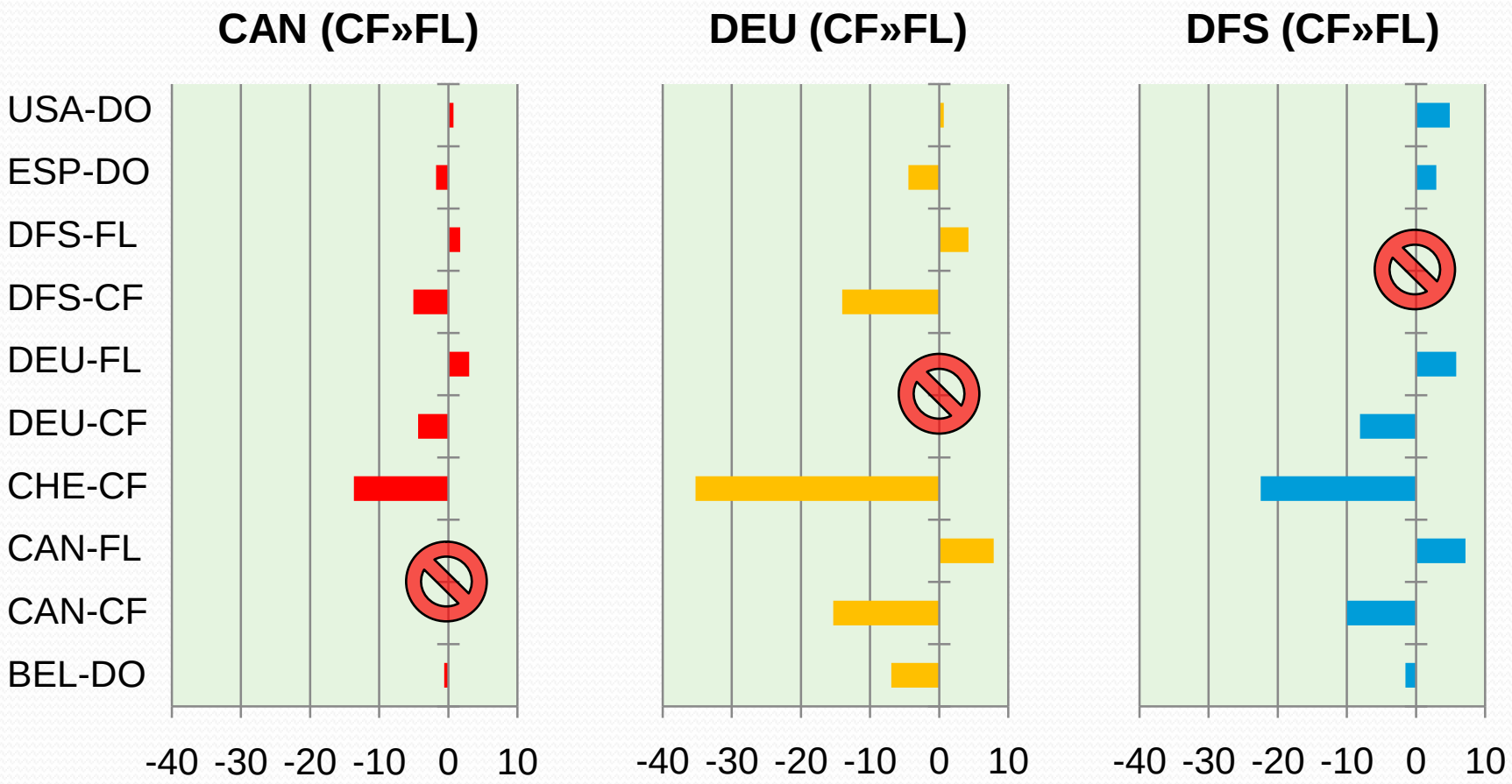
FL= First to last insemination

Changes in between-country genetic correlations

$rg_1 \rightarrow rg_2$ from a two-trait country => Changes in the rest?

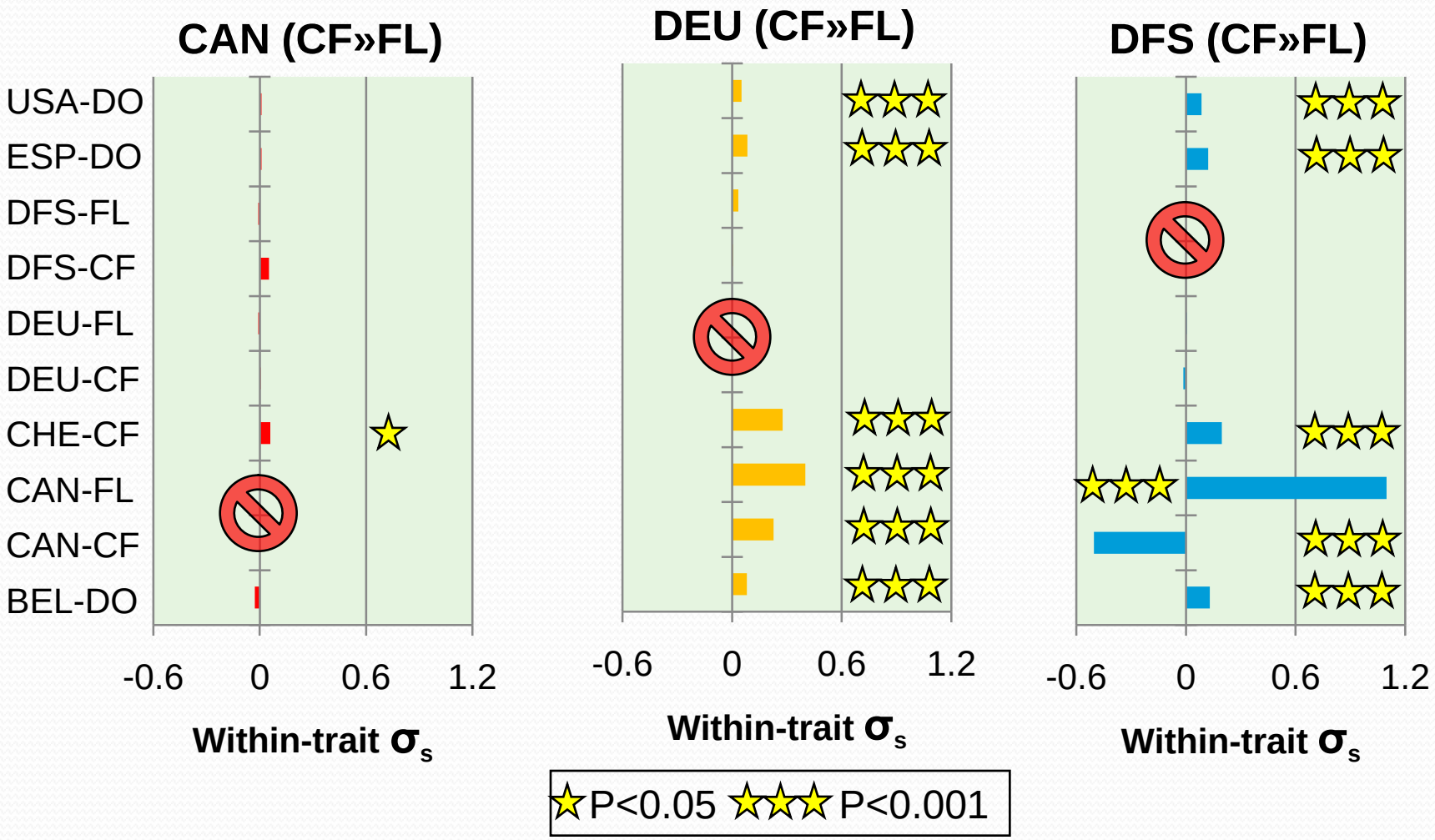


Changes of international reliabilities



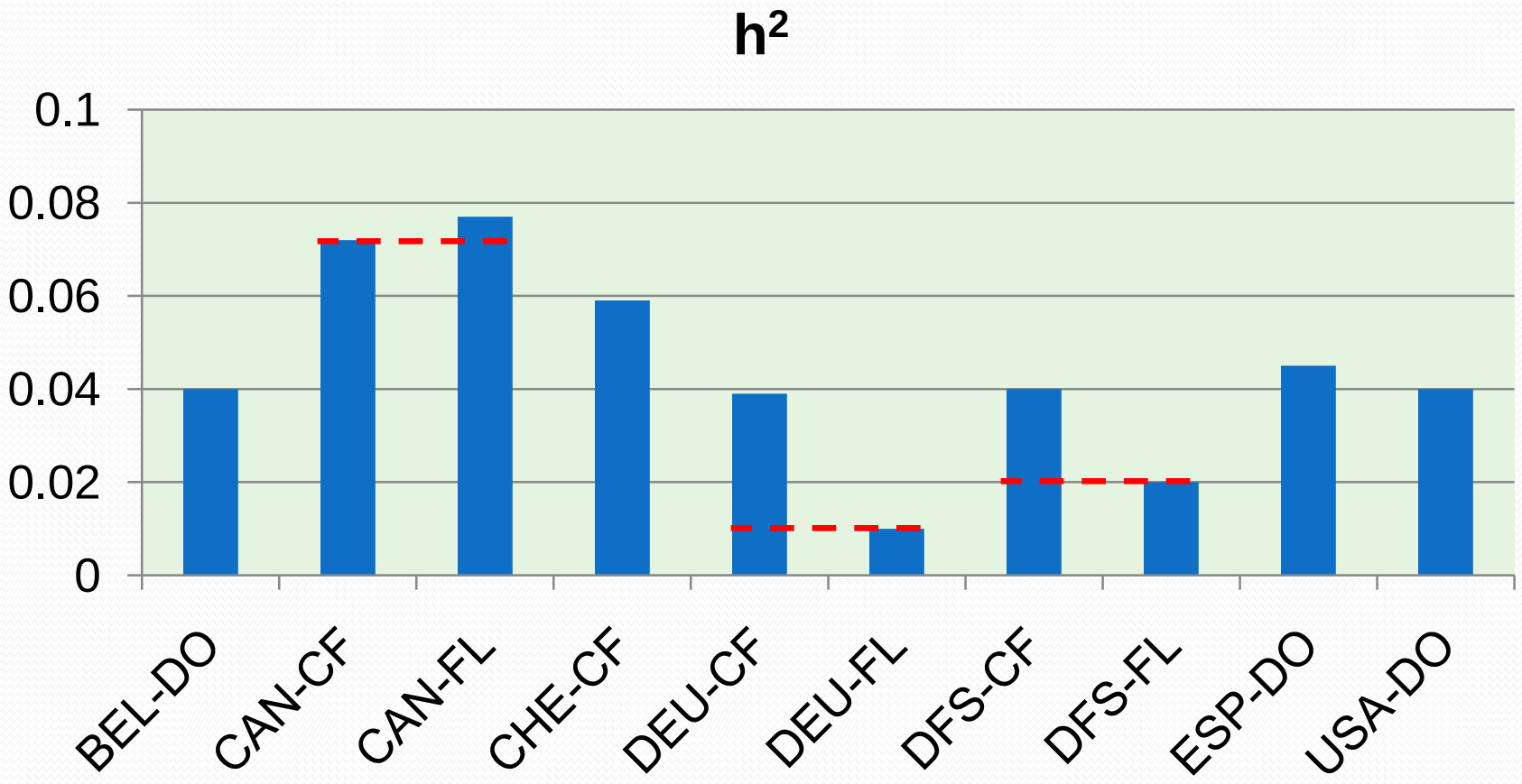
P<0.001

Changes of international EBVs

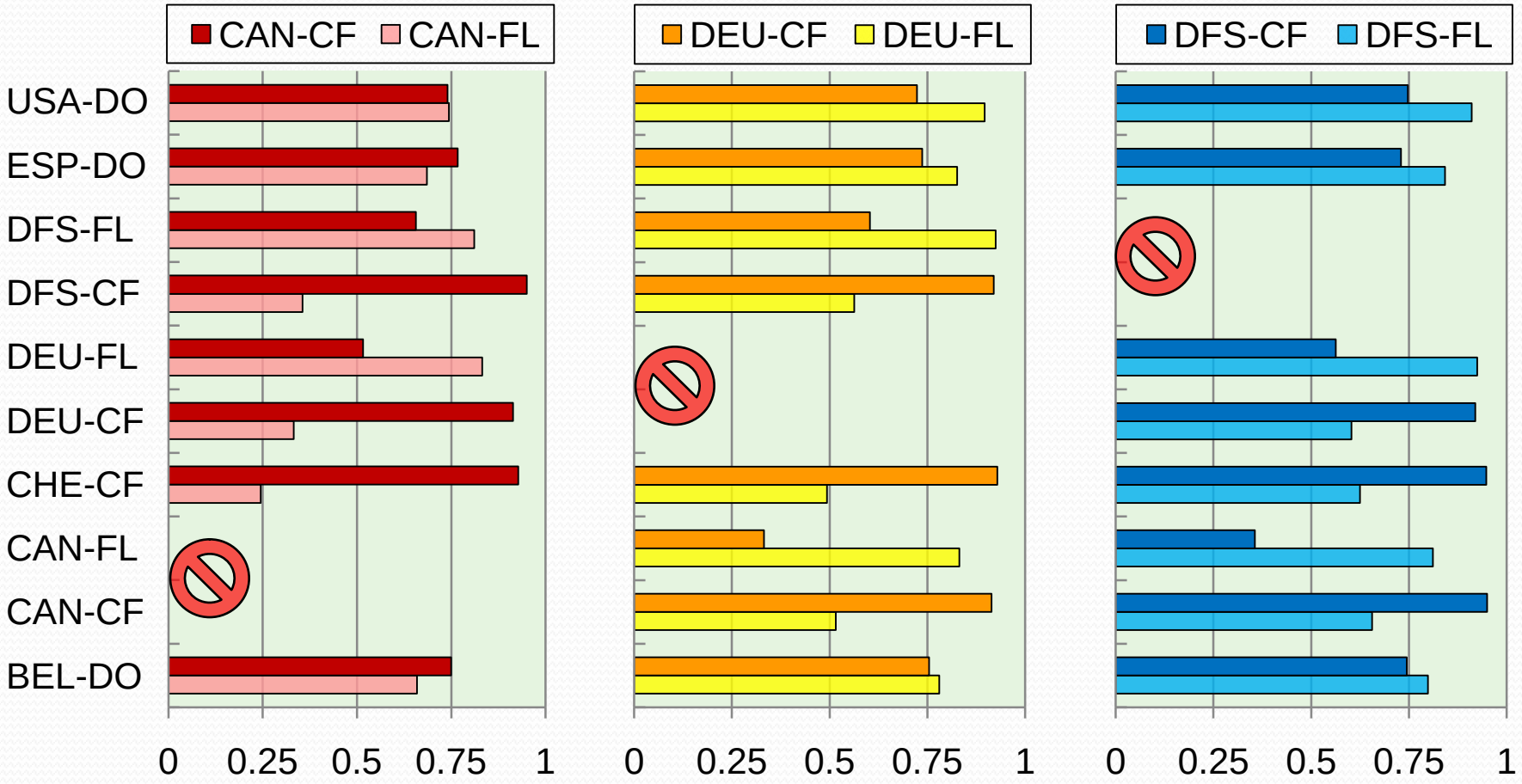


What are the important underlaying reasons behind these changes?

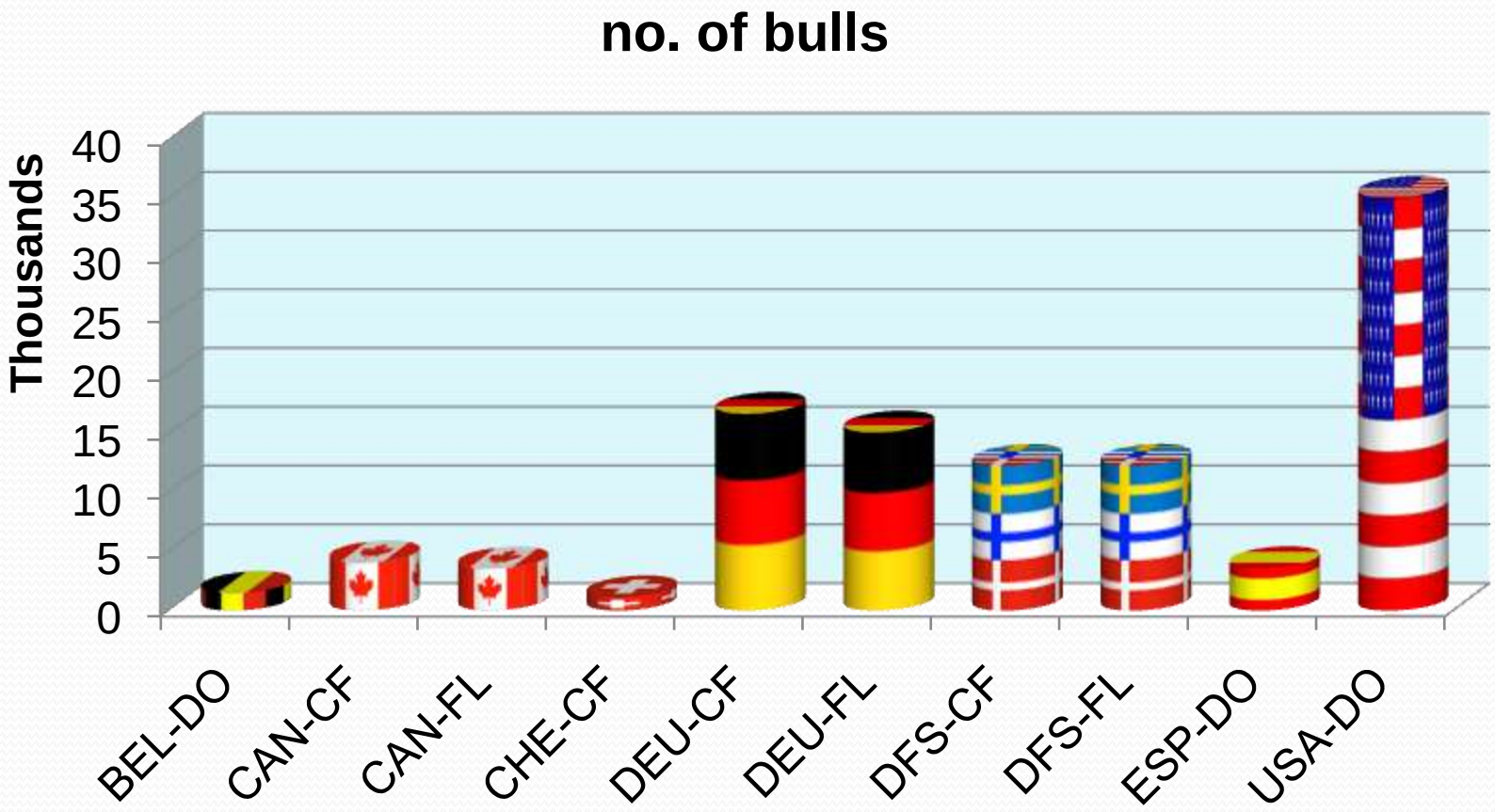
Heritabilities



Differences in the genetic correlations



Population size



Changes of international evaluations due to the choice of alternative traits

Partial correlation coefficients

Variable	h^2_i	h^2_2-h^2_1	rg_2-rg_1	Log n. bulls
Δrg	-0.211	-0.019	-0.410*	0.034
ΔRel.	0.193	0.586**	0.836***	0.480*
Δ|EBV|	0.767***	0.116	0.597**	0.0002

Conclusion

- The results provided a range of reasonable genetic correlations for multi-country multi-trait genetic evaluations
- In most cases, $\mathbf{rg}_{i,j1} \leftrightarrow \mathbf{rg}_{i,j2}$ had no effect on $\mathbf{rg}_{i,k}$ ($j \neq k$)
- International breeding values changed for some country-traits, especially for small populations due to the choice of alternative traits
- Reliabilities were expectedly affected by the choice of traits
- Applying this method provides a firm base for comparisons between the current well-defined method (ST-MACE) and the coming results of MT-MACE