

Use of international clinical mastitis as independent trait in the USA evaluation system

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MASTITIS OVERVIEW



- Evidence of selection goes back four decades
- Unfavorable correlations with milk yield (0.24 - 0.55; Heringstad et al., 2000)
- Low heritable trait (~3%)
- Introduction of genomics in 2009



MAS IMPLEMENTATION IN THE US



- Holstein -> April 2018



- Jersey -> April 2020



- PTA presented as % points of event resistance above or below breed average

PHENOTYPES PER ROUTINE RUN

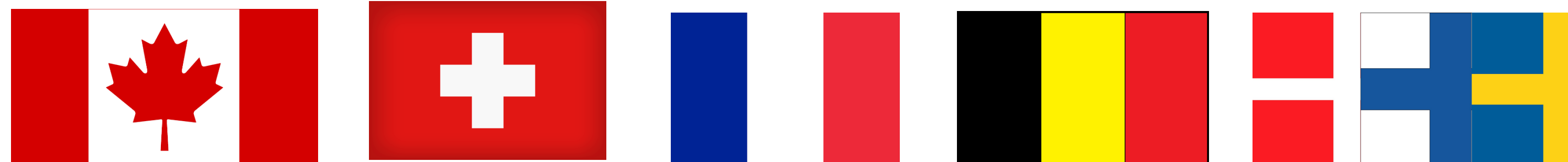
Run	TOTAL	HOL	JER
1804r	1.8 M	1.8 M	-
1808r	2.0 M	2.0 M	-
1812r	2.2 M	2.2 M	-
1904r	2.4 M	2.4 M	-
1908r	2.6 M	2.6 M	-
1912r	2.8 M	2.8 M	-
2004r	4.0 M	3.2 M	382 K
2008r	4.4 M	3.7 M	478 K
2012r	4.6 M	3.9 M	520 K
2104r	5.1 M	4.2 M	582 K

THE USE OF MAS FOREIGN INFORMATION

- Domestic reference population enhancement
- Infectious disease causing inflammation of the mammary gland
- Countries exchange: pure clinical mastitis, SCS or clinical/subclinical mastitis

MAS EXCHANGE ISSUE

- Historical correlated SCS data may outweigh direct MAS
- Correlated SCS not to be used with direct MAS
 - Unless multi-trait models are being used...
- Limited use of bulls coming in US





CLINICAL MASTITIS AS INDEPENDENT GROUP TRAIT

CLINICAL MASTITIS AS AN INDEPENDENT TRAIT

- SNP training for clinical mastitis (**STCM**) to better estimate SNP effects
- Test run - January 2021
- First release - April 2021



CLINICAL MASTITIS AS AN INDEPENDENT TRAIT

- STCM sent to Interbull as an independent group trait
- In US: MAS = STCM
- Usage criteria of MAS/STCM
 - STCM for genotyped bulls only
 - Combined SCS/MAS for non-genotyped bulls
- Most of participant countries accounted

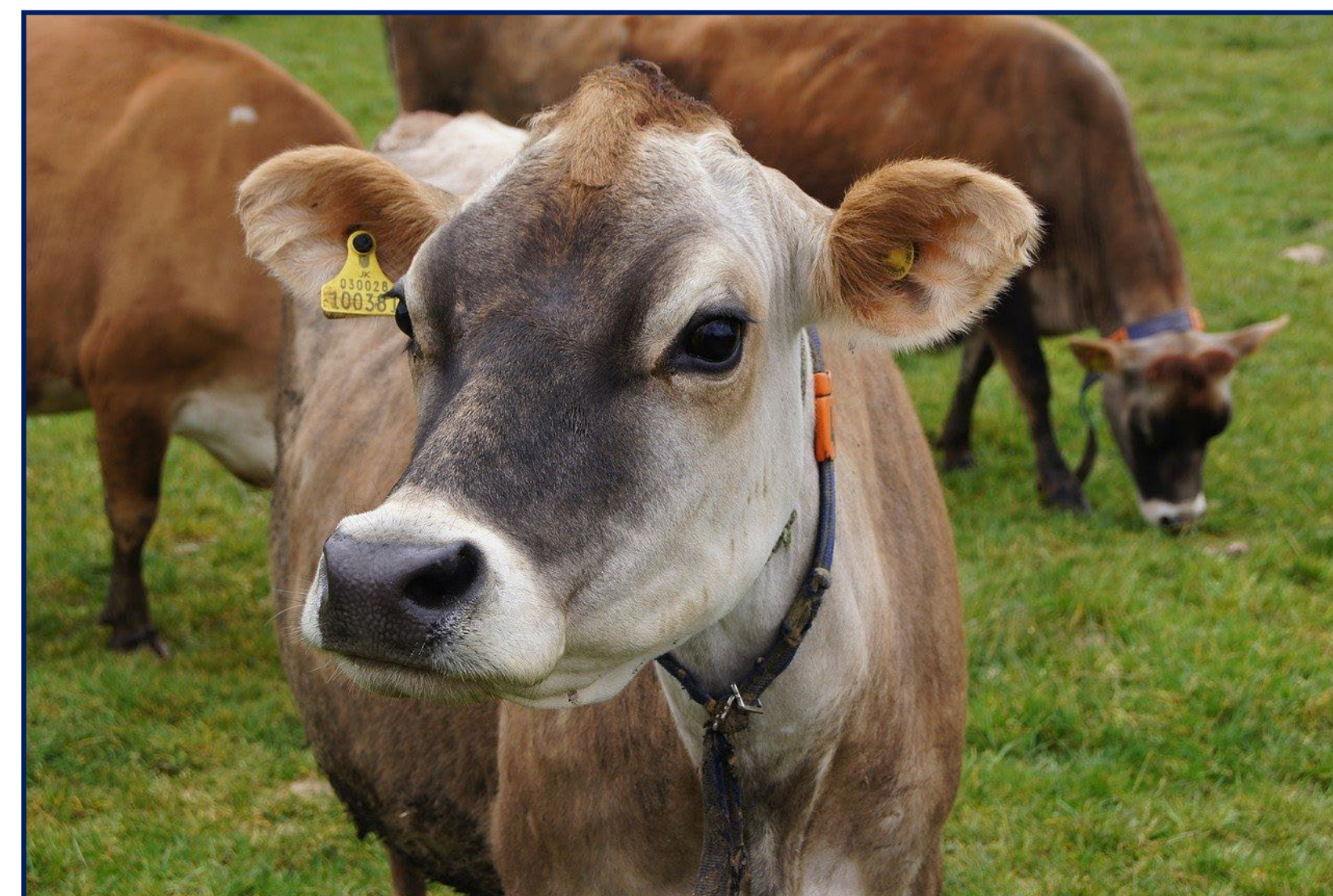


IMPACT ON US EVALUATIONS?

OBJECTIVES



- Compare PTA and REL values between 2012r and 2101t/2104r
- Pearson/Spearman and bias



SCENARIOS

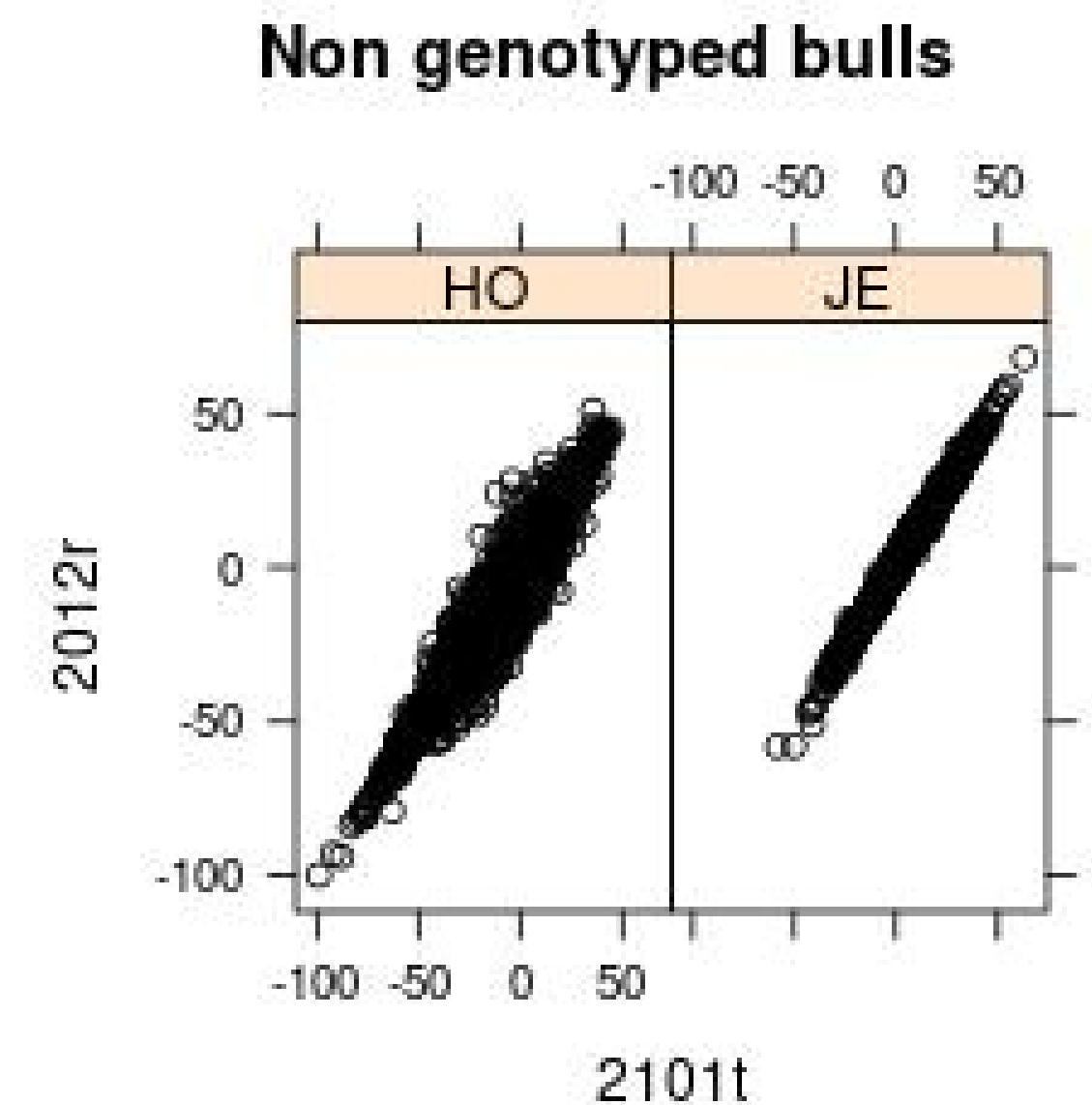
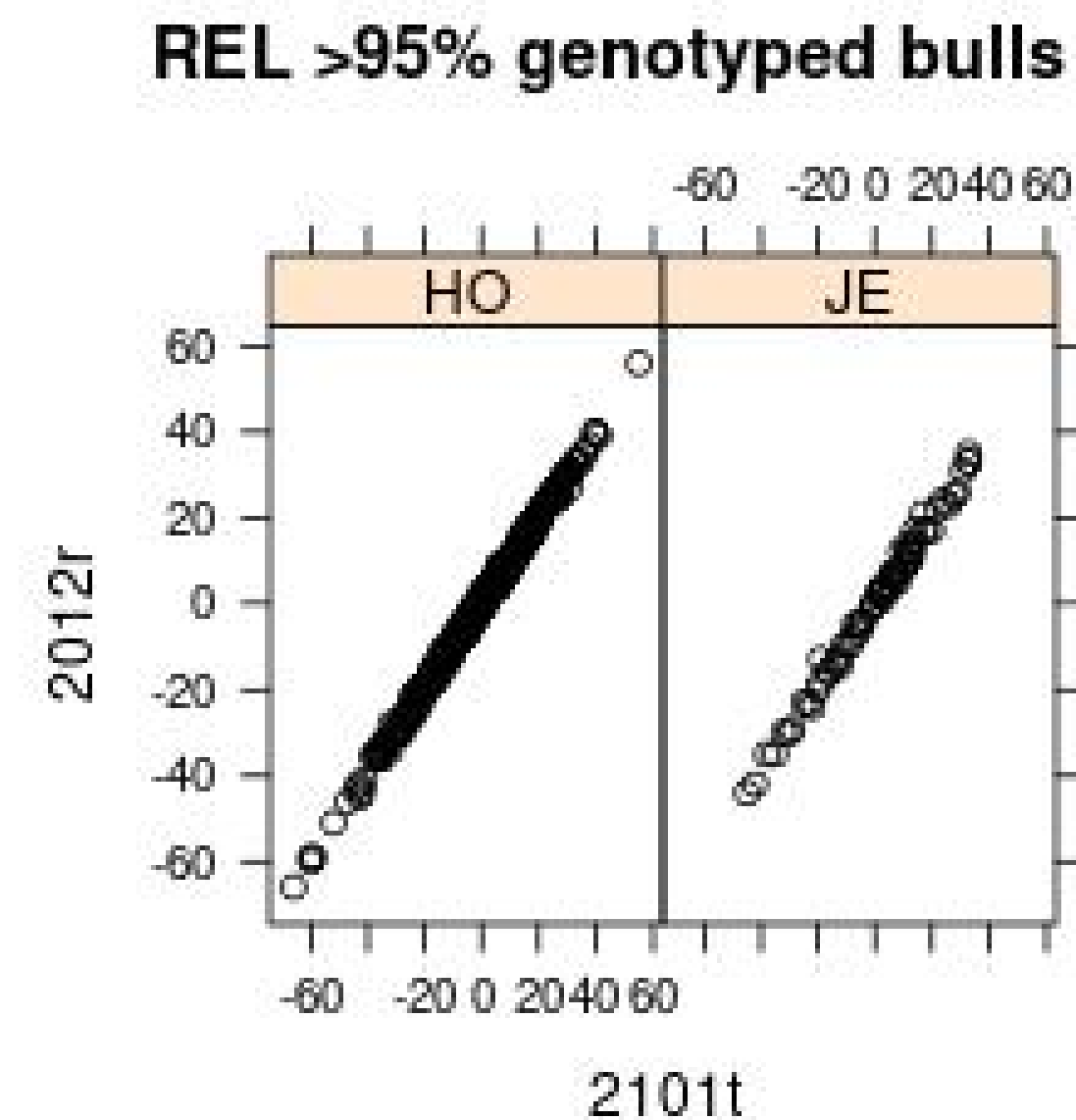
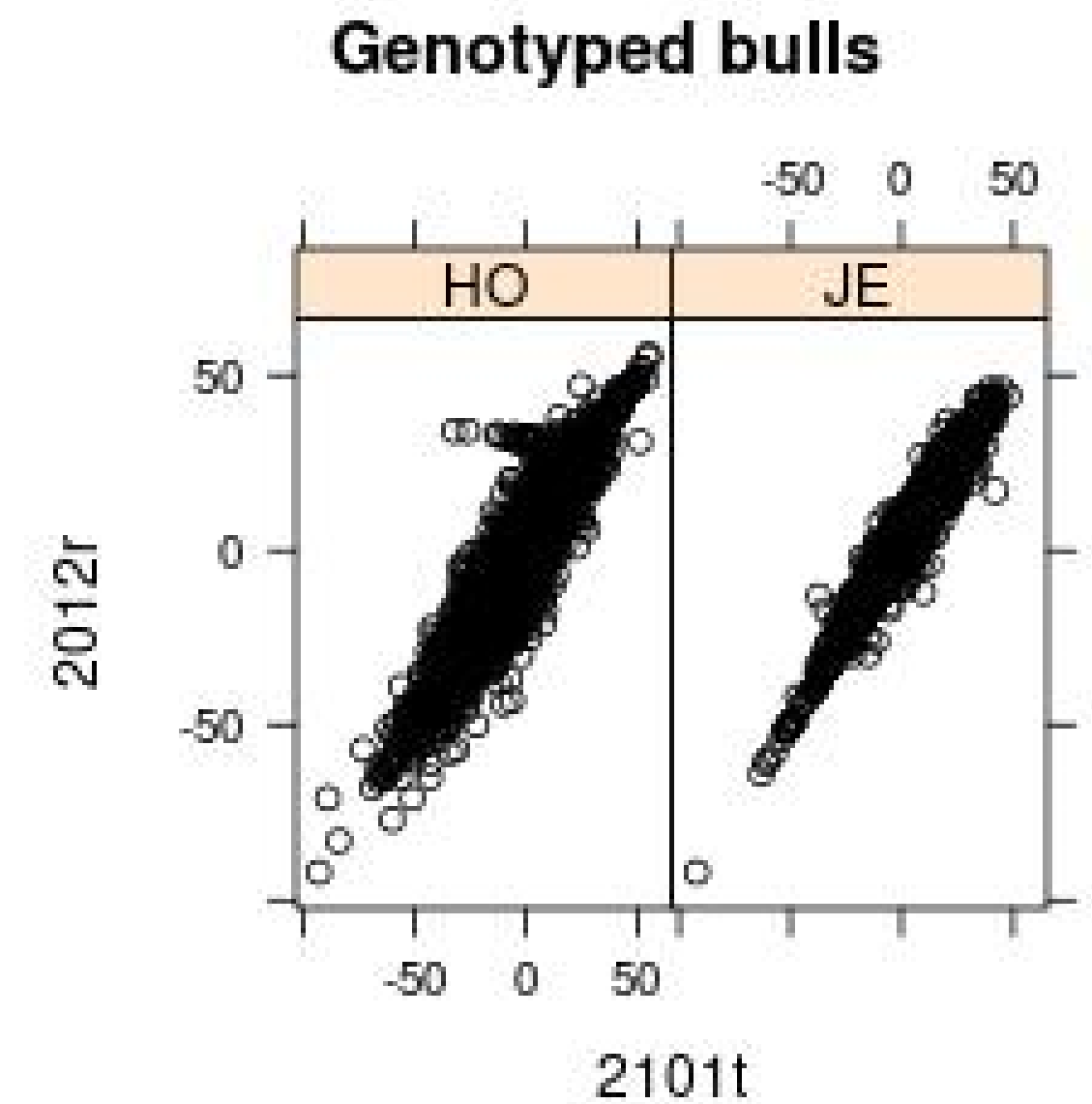
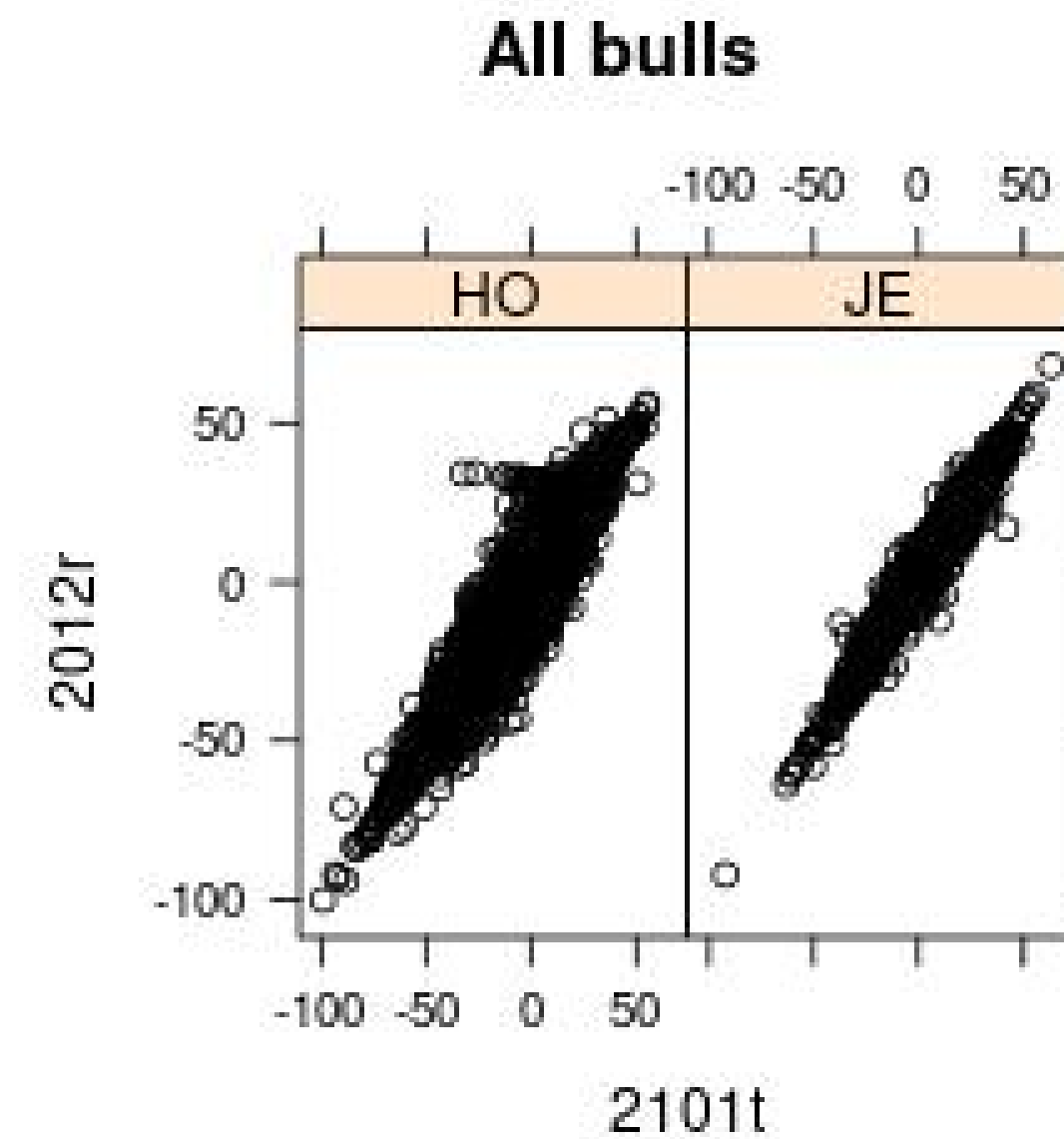


- All bulls
- Genotyped bulls
- High REL (>95%) genotyped bulls
- Non-genotyped bulls

RESULTS

CORRELATIONS 2012r vs. 2101t

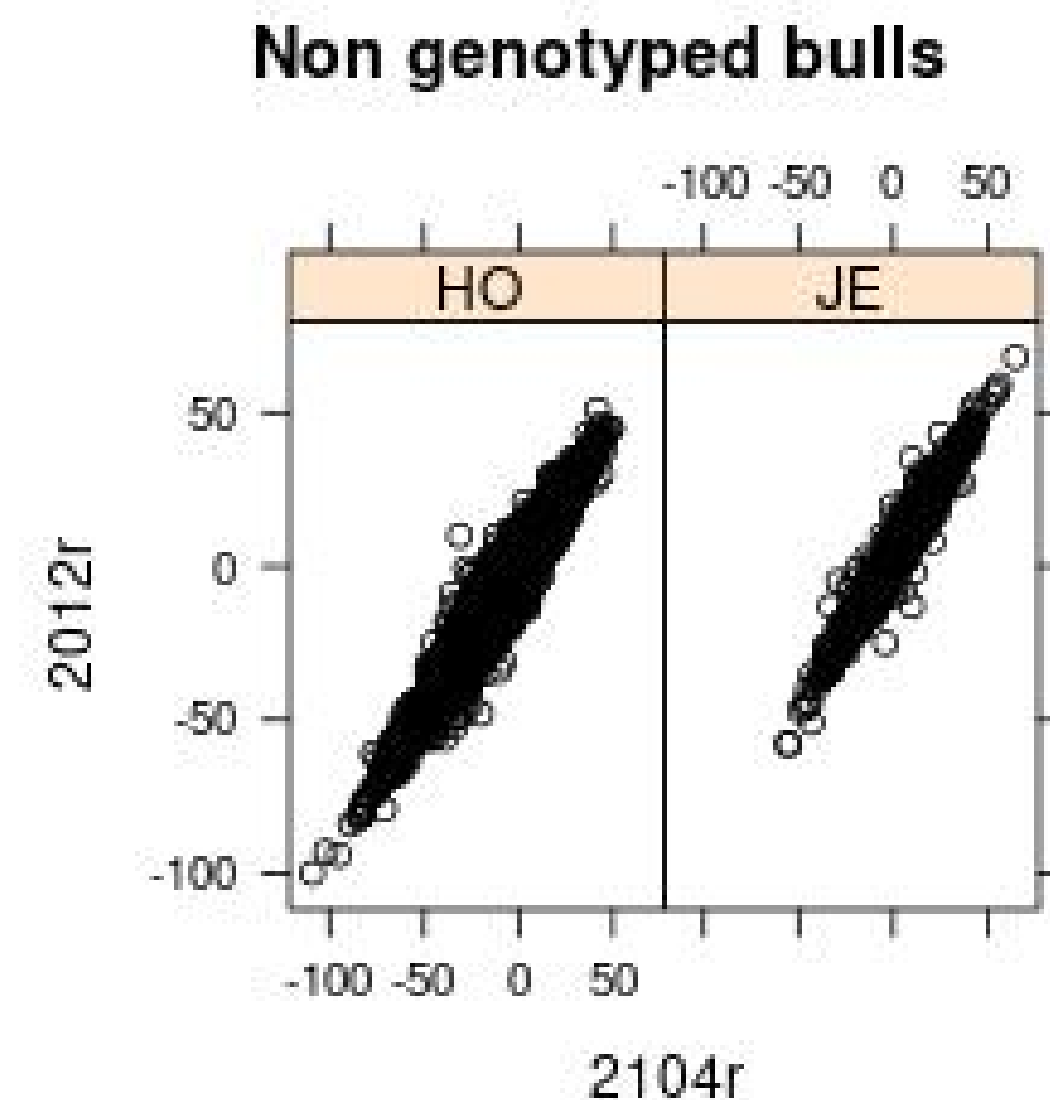
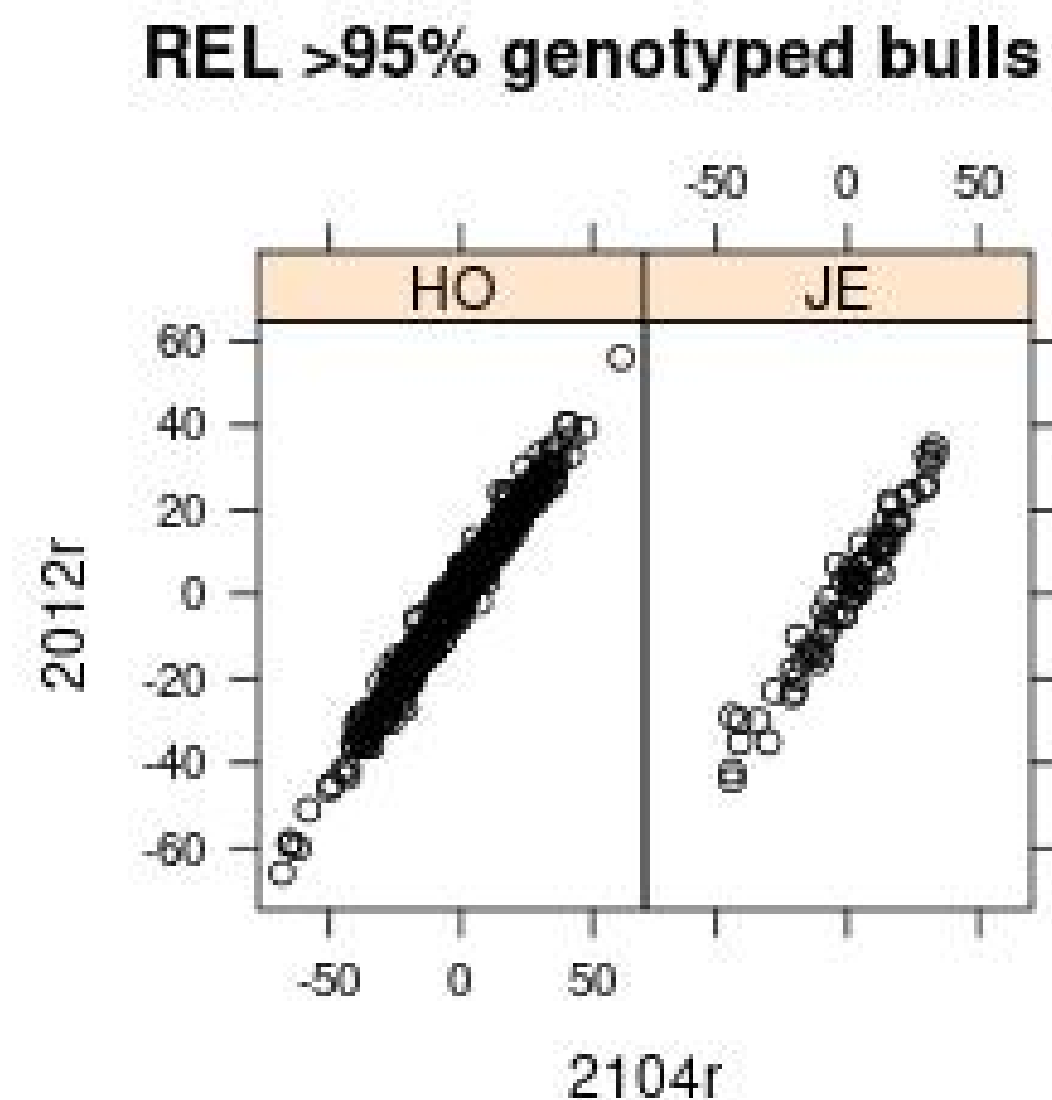
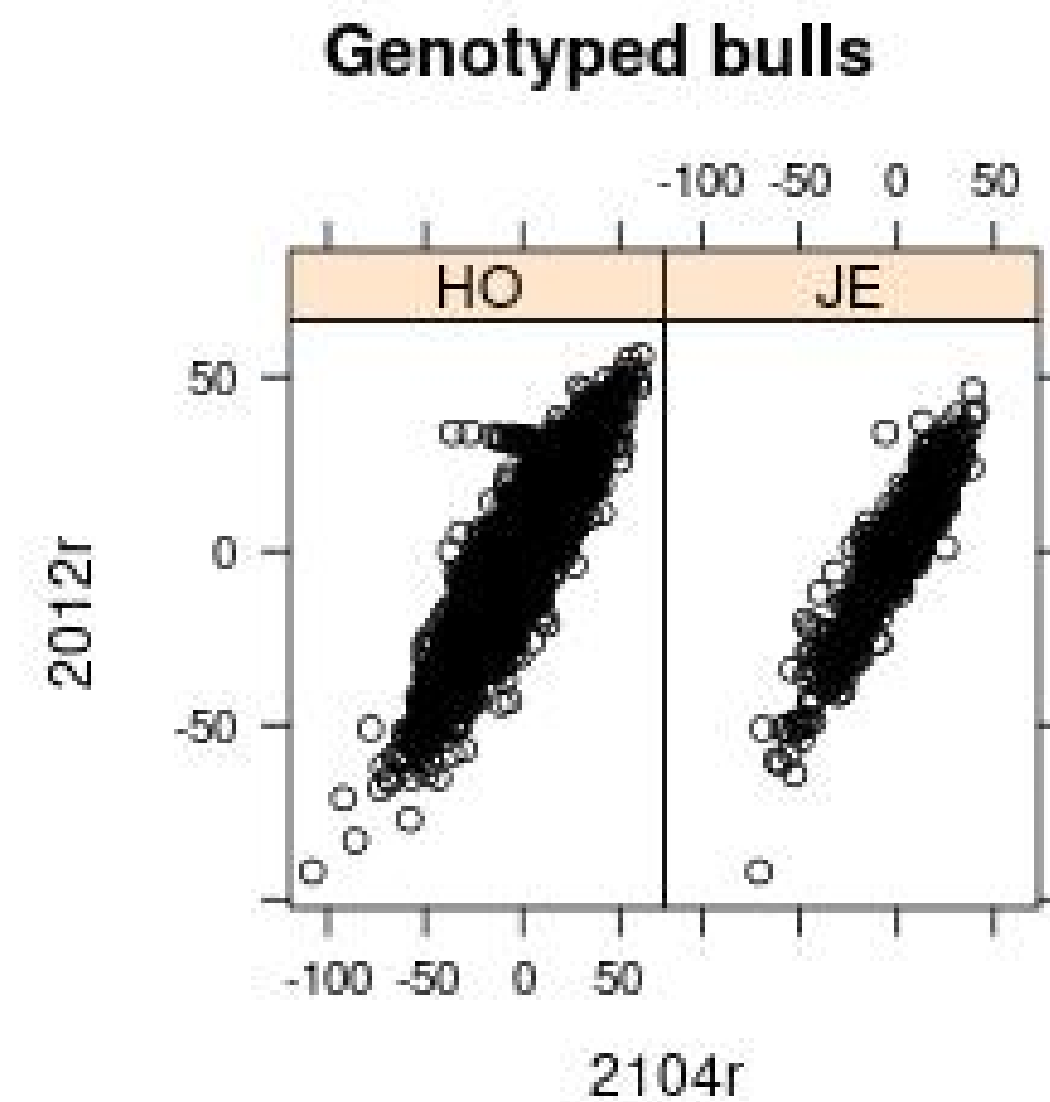
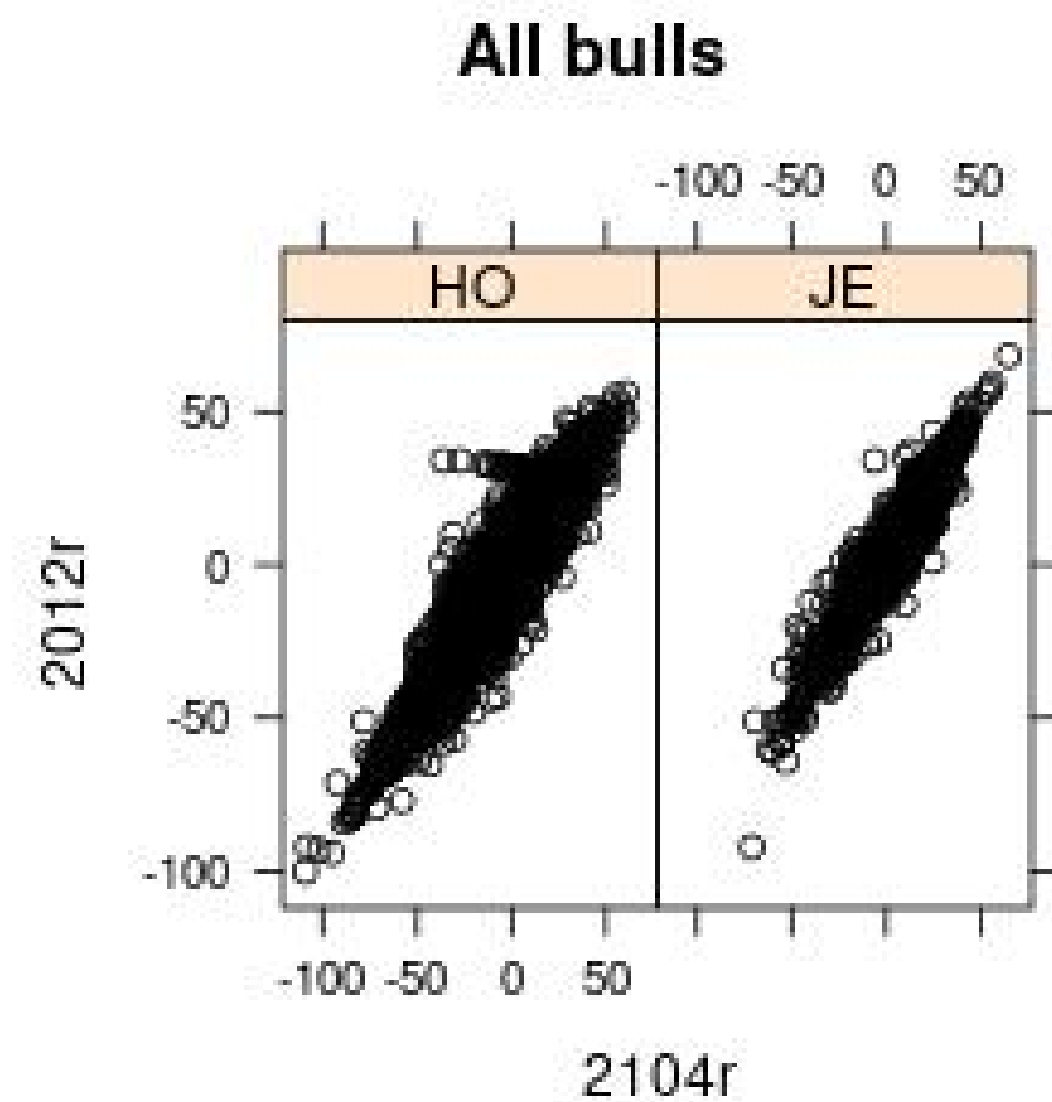
HOL			JER		
Bull scenarios	Pearson	Spearman	Bull scenarios	Pearson	Spearman
All (69,285)	0.99	0.99	All (3,932)	0.98	0.98
Geno (12,307)	0.96	0.96	Geno (1,955)	0.97	0.97
REL >95% geno (425)	1.00	1.00	REL >95% geno (67)	1.00	1.00
Non-geno (56,978)	1.00	0.99	Non-geno (1,977)	1.00	1.00



RESULTS

CORRELATIONS 2012r vs. 2104r

HOL			JER		
Bull scenario	Pearson	Spearman	Bull scenario	Pearson	Spearman
All (67,742)	0.99	0.99	All (2,648)	0.97	0.97
Geno (10,401)	0.94	0.93	Geno (672)	0.94	0.93
REL >95% geno (439)	0.99	0.99	REL >95% geno (68)	0.98	0.97
Non-geno (57,341)	1.00	1.00	Non-geno (1,976)	0.98	0.98



BIAS

		2012r vs. 2101t	2012r vs. 2104r
Scenario	Breed	Bias (b1)	Bias (b1)
All	HOL	1.01	0.97
Geno		0.99	0.89
REL >95% geno		0.99	0.90
Non geno		1.01	0.98
All	JER	1.02	0.98
Geno		0.98	0.92
REL >95% geno		0.98	0.92
Non geno		1.06	0.99

TAKE HOME MESSAGES

- Minor impact in US evaluations
- Genetic progress
- Reference population increase
- Interbull to keep track of STCM countries -> REL gain for bulls with STCM daughters

CONCLUSION



ACKNOWLEDGEMENTS



Dairy producers



THANK YOU!

