



IRISH CATTLE BREEDING FEDERATION

IG-HOL Feedback from Ireland

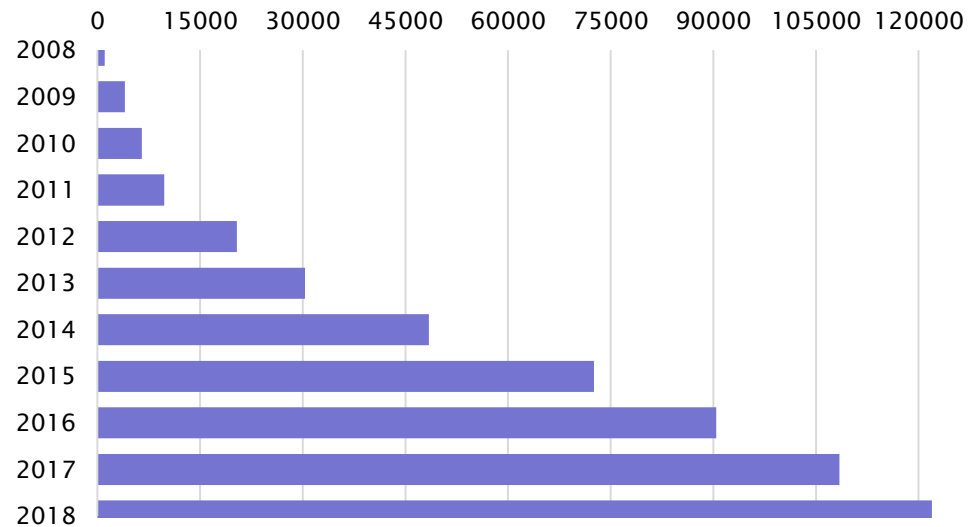


National genomic evaluation

- 122k HO/FR animals genotyped
 - Male – 73.338 (60.06%)
3.054 AI sires
 - Female – 48.763 (39.94%)

- 32 traits
 - 10 EBI traits
 - 22 linear type traits

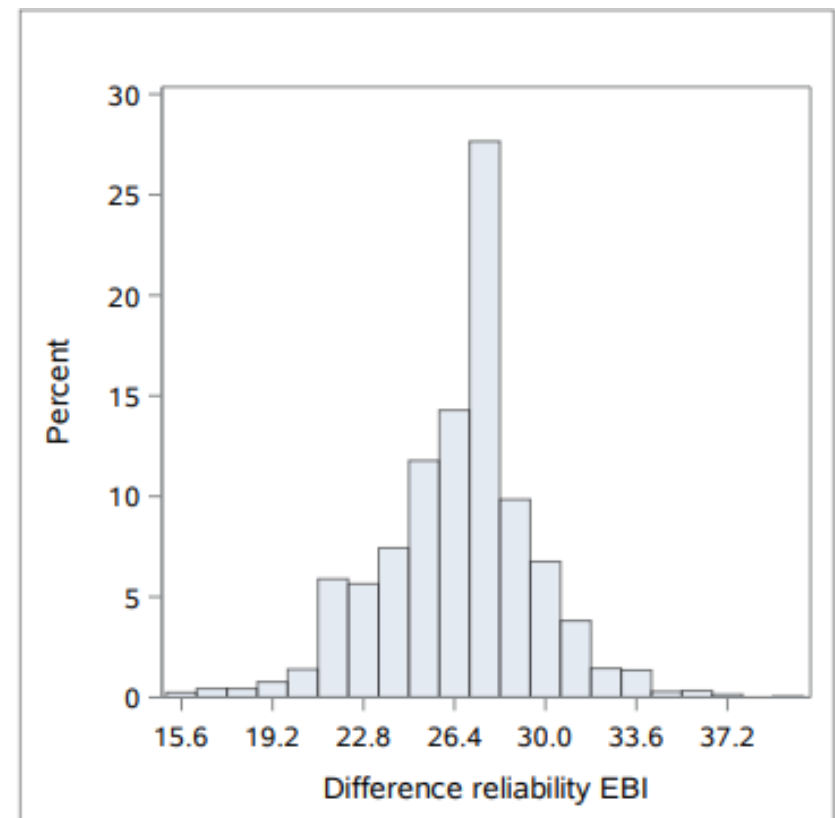
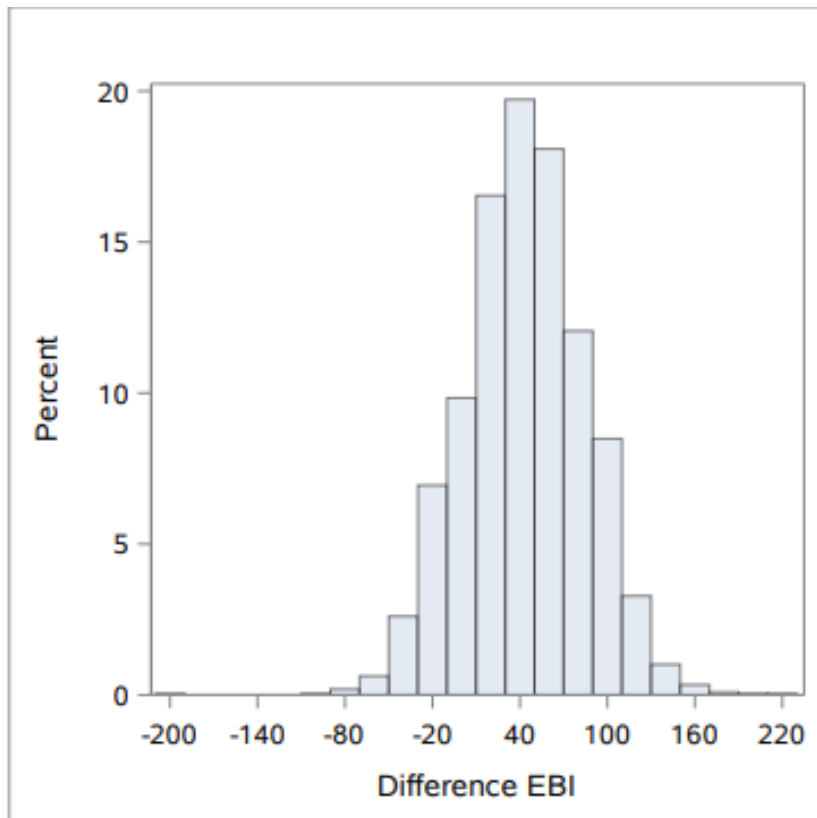
Animals genotyped by year

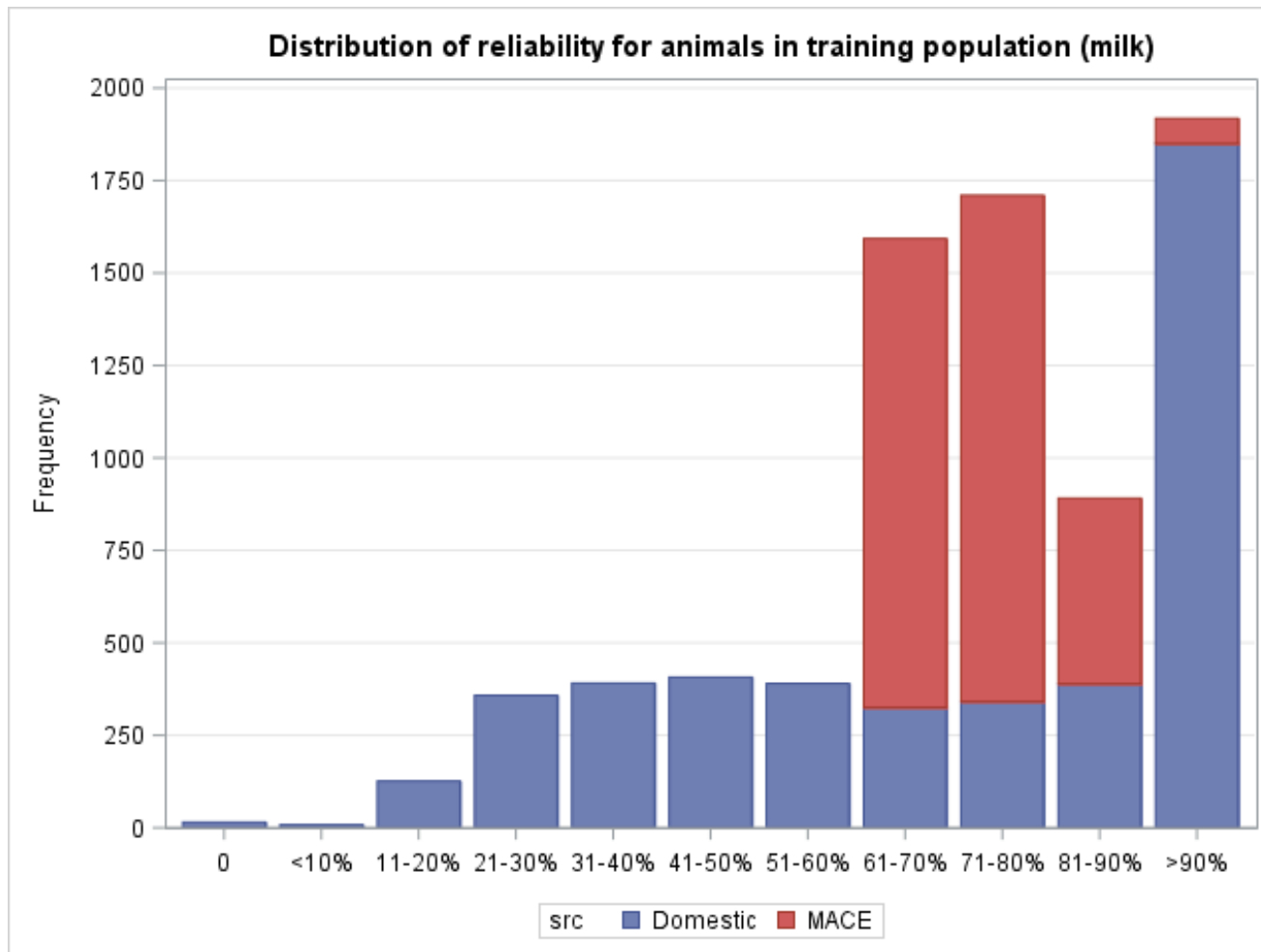


National genomic evaluation

Trait	Training population	Traditional reliability (young animal)	GEBV reliability (young animal)	Difference	%MACE
Milk	7808	25.67%	58.90%	33.22%	41.07%
SCS	7653	19.19%	51.31%	32.12%	45.89%
Fertility	6896	16.52%	43.63%	27.11%	42.62%
Longevity	6495	16.29%	41.87%	25.58%	45.17%
Mastitis	3391	18.65%	38.56%	19.91%	0.00%
Lameness	3075	9.03%	29.97%	20.94%	0.00%
Overall type	8508	9.66%	43.06%	33.40%	6.25%

National genomic evaluation





DGV

Trait	N	Mean		Std Dev		Minimum		Maximum	
		Ireland	IG-HOL	Ireland	IG-HOL	Ireland	IG-HOL	Ireland	IG-HOL
Milk	3405	209.671	186.998	178.098	172.763	-432.511	-633.017	836.29	885.734
Fat	3405	7.140	5.291	6.301	5.799	-19.109	-21.307	31.202	31.211
Protein	3405	7.039	5.468	5.091	5.317	-14.070	-21.488	24.813	25.582
Fertility	3405	1.009	1.560	3.710	3.177	-9.010	-7.029	16.853	16.309
Somatic Cell Count	3405	-0.039	-0.027	0.084	0.071	-0.303	-0.295	0.356	0.316

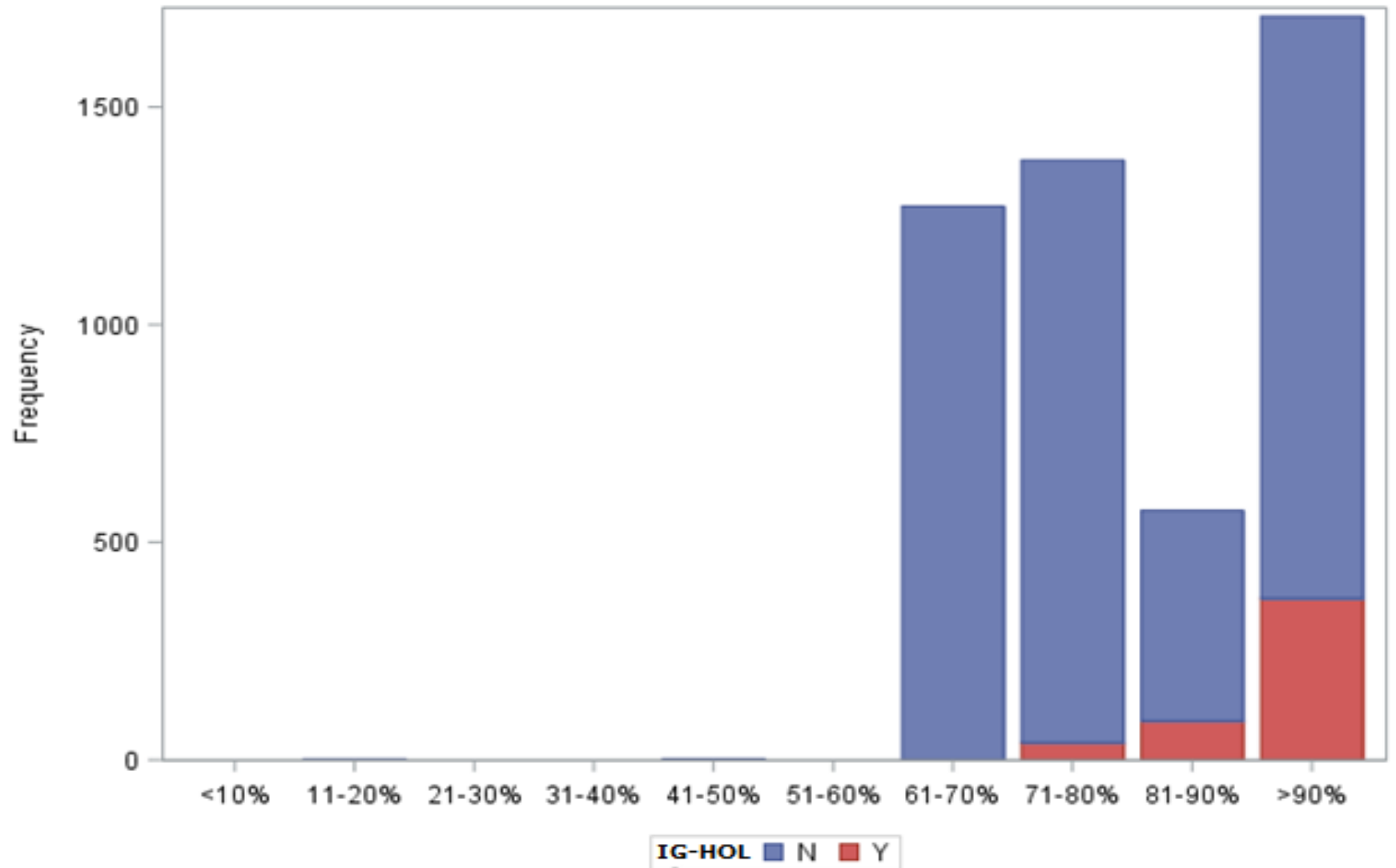
		Ireland				
		Milk	Fat	Protein	Calving Interval	Somatic Cell Count
IG-HOL	Milk	0.8047				
	Fat		0.7501			
	Protein			0.7544		
	Fertility				0.8780	
	Somatic Cell Count					0.7183

GEBV

Trait	N	Mean		Std Dev		Minimum		Maximum	
		Ireland	IG-HOL	Ireland	IG-HOL	Ireland	IG-HOL	Ireland	IG-HOL
Milk	3405	224.423	223.402	183.460	171.450	-429.514	-738.540	900.828	961.932
Fat	3405	7.569	6.644	6.344	5.967	-18.061	-30.469	35.799	31.383
Protein	3405	7.436	6.691	5.135	5.418	-14.651	-30.365	28.474	27.698
Fertility	3405	1.173	1.495	3.867	3.090	-9.885	-6.908	16.236	17.681
Somatic Cell Count	3405	-0.039	-0.038	0.082	0.072	-0.313	-0.294	0.349	0.345

		Ireland				
		Milk	Fat	Protein	Calving Interval	Somatic Cell Count
IG-HOL	Milk	0.8183				
	Fat		0.7813			
	Protein			0.7827		
	Fertility				0.8540	
	Somatic Cell Count					0.7476

Distribution of reliability for animals in training population with MACE proof



Example animal mistakenly omitted



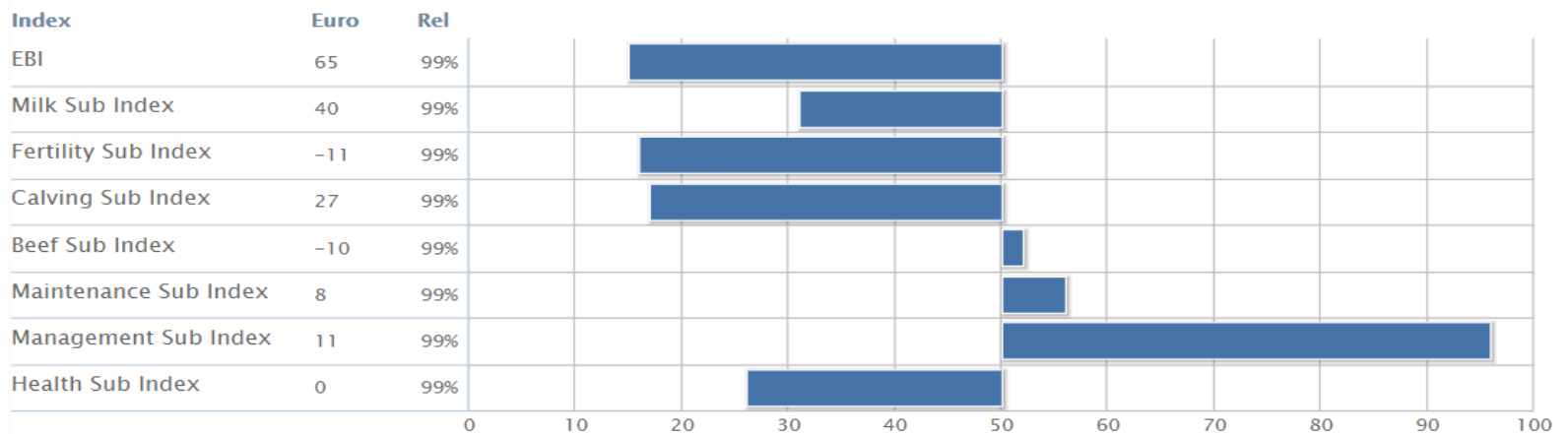
Irish Cattle Breeding Federation

Animal Details

AI Code:	GMI	Breed:	HO (100%)
Animal Name:	GALTEE MERCI ET	Owner:	NATIONAL CATTLE BREEDING CNTR
Sex:	MALE	Date of Birth:	01-SEP-1992
National ID:	6021231601	Date of Evaluation:	May 2018
International ID:	HOLDEUM001021231601		

Valid DNA sample received (SNP)

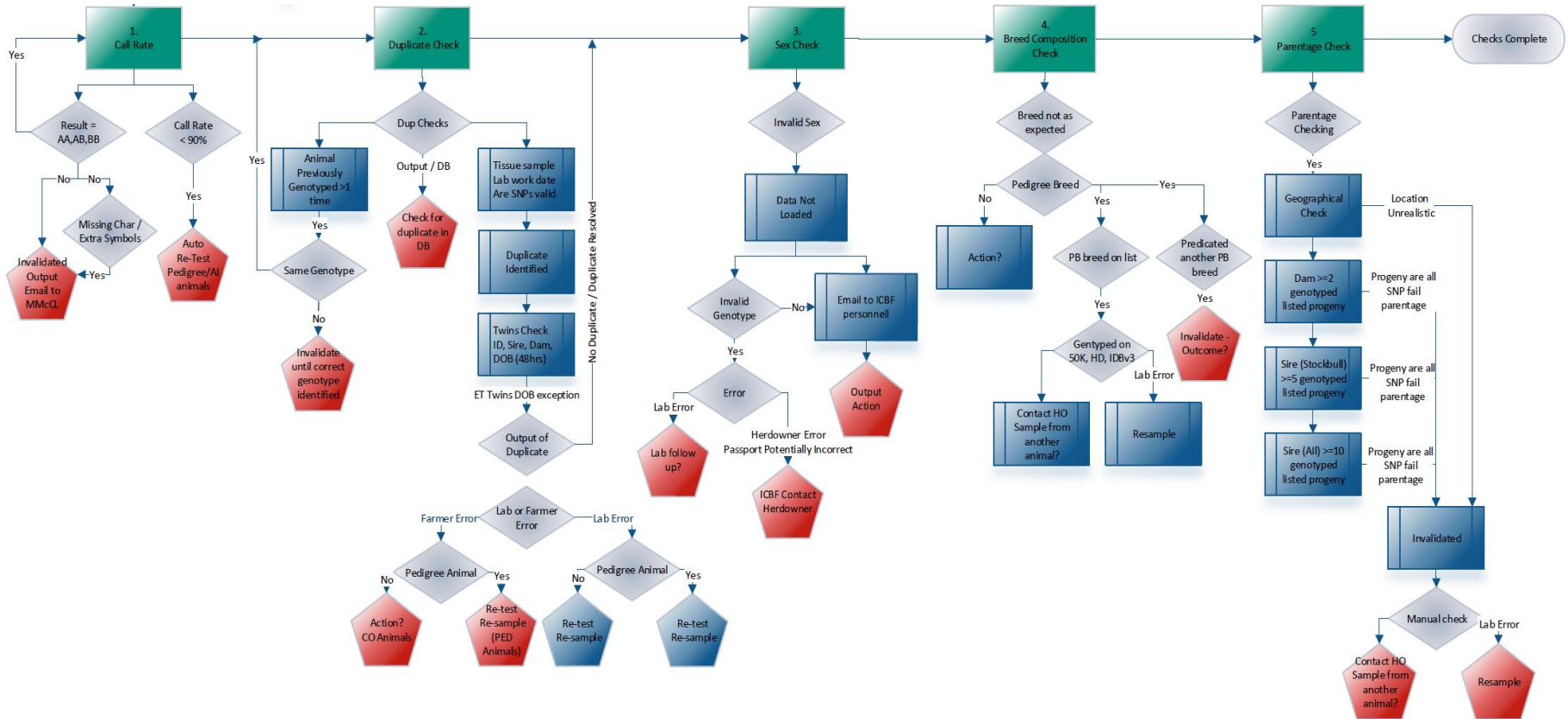
EBI Summary Milk Fertility Calving Beef Health Conformation Pedigree Previous Evaluation



Conclusion

- Initial correlations fore DGV and GEBV look positive
- Expect improvement with additional sires
- Validation important to assess benefit?
- Looking forward to next iteration

Genotype quality control process



Parentage verification and prediction

- Parentage check and prediction based on 800 SNPs (maximum 1% SNP mismatch)
- 200 ISAG (minus 5, clustering and low MAF)
- 605 additional based on high MAF >45% across 50 breeds in reference population

<https://www.frontiersin.org/articles/10.3389/fgene.2018.00084/full>

METHODS ARTICLE

Front. Genet., 15 March 2018 | <https://doi.org/10.3389/fgene.2018.00084>



SNP Data Quality Control in a National Beef and Dairy Cattle System and Highly Accurate SNP Based Parentage Verification and Identification

 Matthew C. McClure^{1*},  John McCarthy¹,  Paul Flynn²,  Jennifer C. McClure¹,  Emma Dair¹,  D. K. O'Connell¹ and  John F. Kearney¹

¹Irish Cattle Breeding Federation, Cork, Ireland

²Weatherbys Ireland, Kildare, Ireland



**ACCREDITED DNA DATA
INTERPRETATION CENTRE**
for Parentage Verification by SNP
Exp.: August 2020

Genomic Evaluation Report

Jumbo	1568	Lact. No	
Tag	IE151013781568	Sex	M
Name		Sire	SOK (€ 257)
DOB	15-Feb-2012 0y 1m	Dam	IE151013760948 (€ 165)
Breed	HO (81%), FR (19%)	Dam's Sire	RUU (€ 152)
Date of Evaluation	23-Mar-2012		

Index	Official Genomic Evaluation	Reliability	Weighting on Genomics	DNA Value	Parent Average Evaluation	Reliability	Diff.from Parent Avg	Increase In Reliability
EBI €	290	45%	29%	274	211	27%	+79	18%
Milk Sub Index €	93	53%	38%	92	63	30%	+30	23%
Fertility Sub Index €	162	36%	23%	148	117	21%	+45	15%
Calving Sub Index €	40	50%	24%	39	32	35%	+8	15%
Beef Sub Index €	0	44%	21%	-1	-1	29%	+1	15%
Maintenance Sub Index €	-7	39%	20%	-7	-4	25%	-3	14%
Health Sub Index €	2	49%	37%	2	4	25%	-2	24%
Milk Sub Index								
Milk (Kg)	225	53%	38%	310	142	30%	+83	23%
Fat (Kg)	18.8	53%	38%	18.7	12.5	30%	+6.3	23%
Protein (Kg)	15	53%	38%	16.2	10.2	30%	+4.8	23%
Fat (%)	0.18	53%	38%	0.13	0.13	30%	+0.05	23%