



**Increasing Genetic Gain in Dairy.**

**Discussion Group Sessions**

**Date: Spring 2021**



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AgTech - it's in our DNA

# Overview

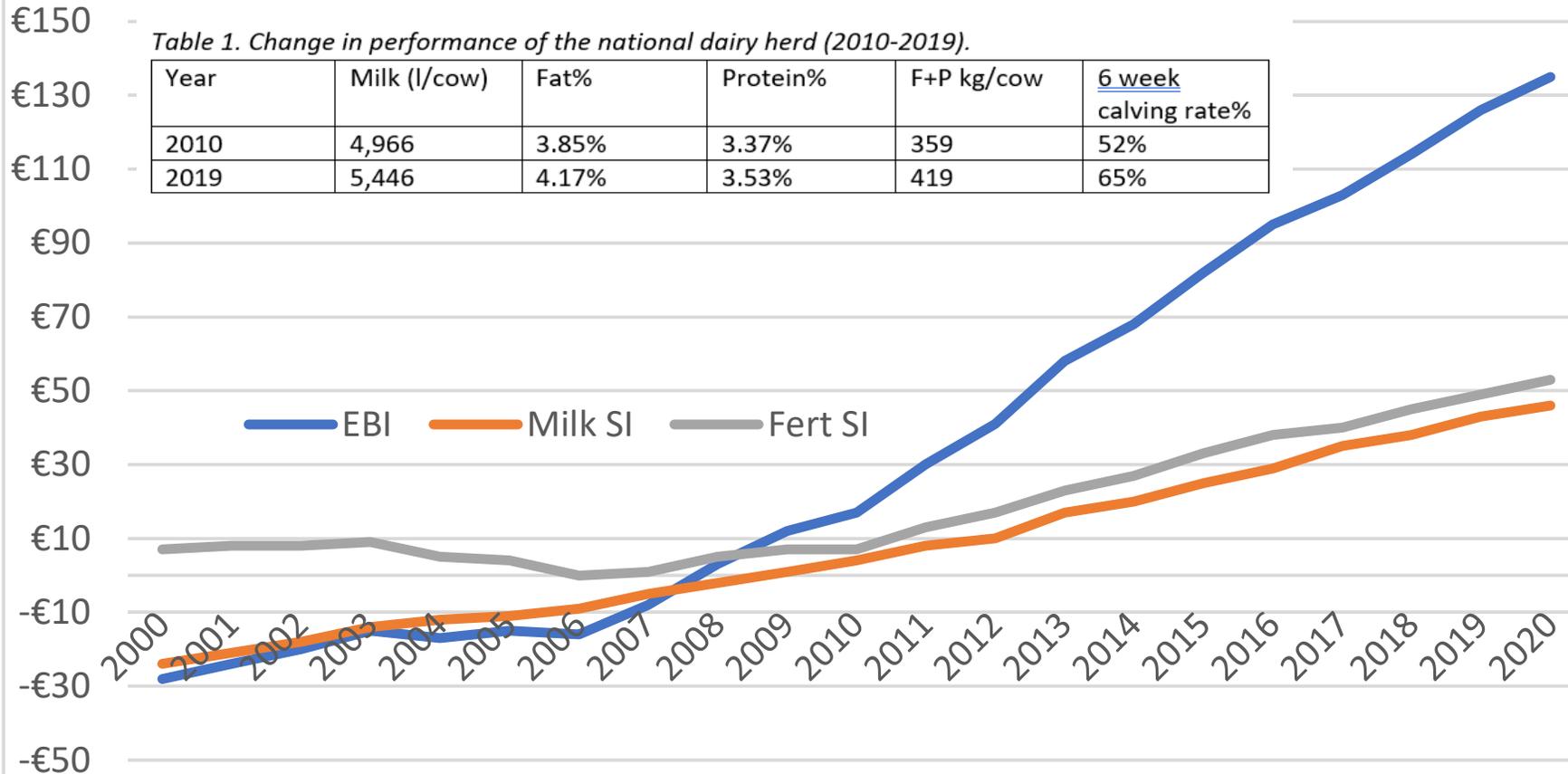
- Group priorities for next 5-10 years.
- Discussion Group Analysis;
  - EBI, milk solids & fertility trends.
  - Bull usage & Sire Advice.
  - Dairy genomics & GEN€ IRELAND.
  - Looking forward; the next 10 years.
- Summary.

# What has EBI delivered; National level?

## Genetic Trend in EBI by year of first calving

Table 1. Change in performance of the national dairy herd (2010-2019).

Year	Milk (l/cow)	Fat%	Protein%	F+P kg/cow	6 week calving rate%
2010	4,966	3.85%	3.37%	359	52%
2019	5,446	4.17%	3.53%	419	65%



- Average EBI of 1<sup>st</sup> calving heifers this (n=313k) = €135.
- Rate of gain in EBI now €10.6/year (0.15 GSD/year) => €284/lact or 5 cpl.
- The cows you have now are better than the cows that you had 10 years ago!

# EBI is delivering; Across systems.

## Fertility Performance 2013-2016



	Elite	NatAv	Sig
Submission rate (%)	92	86	*
Pregnancy rate first service (%)	61	46	*
Pregnancy rate first 6 weeks (%)	73	58	***
Final pregnancy rate - 12 wks (%)	92	81	***
Calving to conception (days)	93	97	*
No. of services	1.57	1.77	**

© Teagasc 2016  
Reproductive efficiency and survival of Holstein Friesian cows of divergent Economic Breeding Index, evaluated under seasonal calving pasture-based management  
M. O'Sullivan, T. Boland, K. R. Pinner, M. A. Cross, R. O'Sullivan, K. Pinner

T2. UCD Systems Trial (2016-2020)					
Traits	2016	2017	2018	2019	2020
F+P kg/cow	588	595	544	586	610
1st service conception rate %	43	50	69	64	74
6 week pregnancy rate	59	54	83	79	87
Empty rate %	9	15	13	12	9

- Systems trial at UCD Lyons Research Farm.
- EBI of herd = €206 (Top 1%).
- Meal fed = 1.5 t per cow per year.

**Key point; High EBI cows are delivering, regardless of system.**

- System trial at Teagasc Moorepark.
- EBI's; Elite herd = €214, National Ave herd = €110
- Meal fed = 0.5 t per cow per year.

# Herd EBI for Discussion Group



## Discussion Group EBI Report

(Printed 07/04/21)



Table 1. National EBI Ranking of herds & cows

	Top 1%	Top 5%	Top 10%	Top 25%	Ave
Herd EBI	€180	€164	€156	€139	€118
Cows	€223	€196	€182	€156	€120
Heifers	€249	€224	€213	€195	€170

Evaluation Date: Mar 2021

- Average EBI of cow herd is €162 with €71 from fertility.
- Good improvement for EBI and fertility sub-index across 1<sup>st</sup> Lactation (€176), In-calf heifers (€191) and calves (€213)
- Well done!

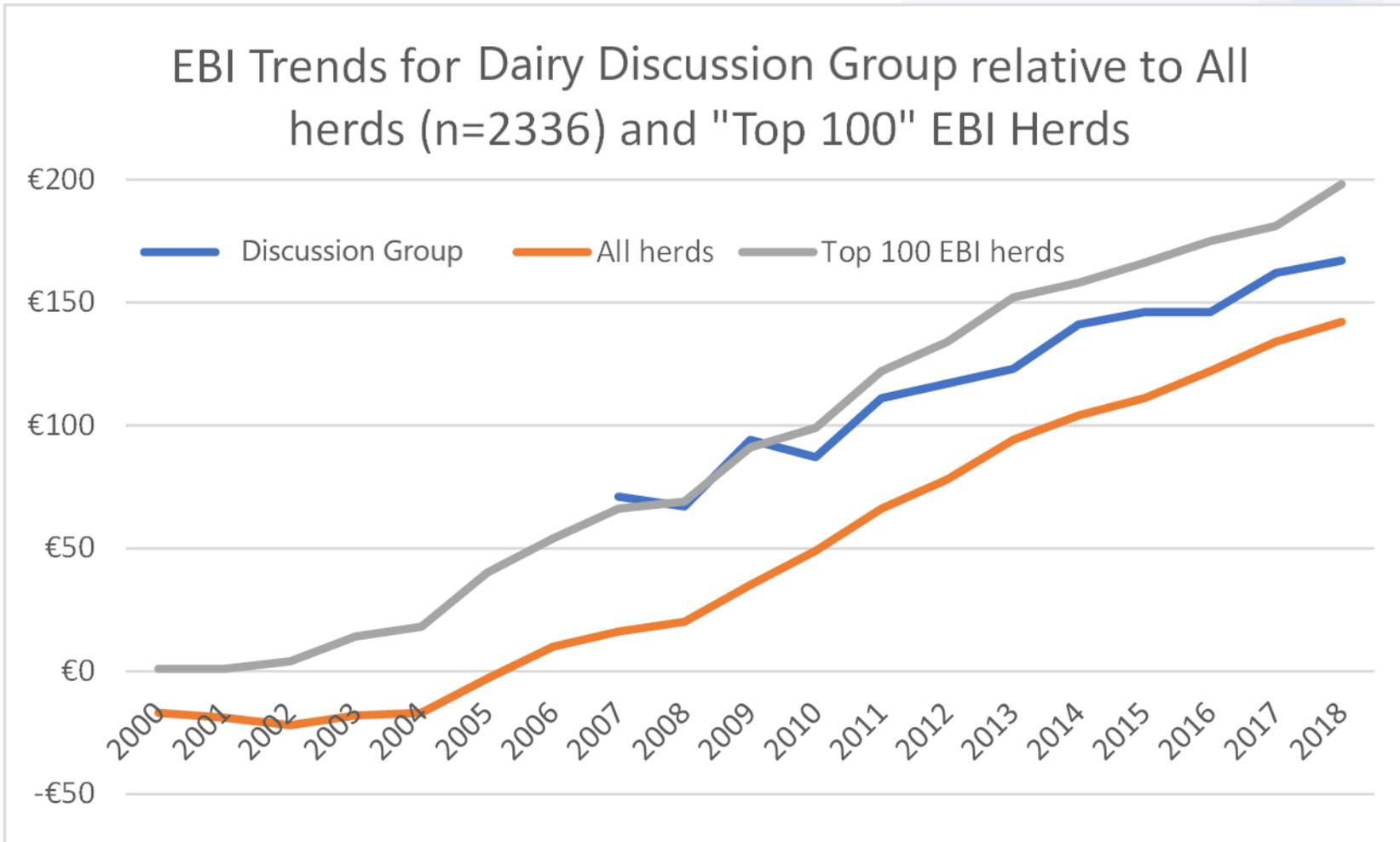
Name	Herd ID	Total Cows	Cows with EBI	Herd EBI €	Milk Sub		Fertility		1st Lactation			1 Year +			0-1 Year			Avg Yearly EBI Gain €
					€	%	€	%	No.	EBI €	Fert €	No.	EBI €	Fert €	No.	EBI €	Fert €	
		322	322	155	52	28.4	63	34.6	96	169	66	82	191	73	84	215	86	9.76
		62	62	158	48	25.1	74	38.9	14	163	75	16	181	77	17	191	74	5.7
		157	157	158	30	16.6	84	46.4	22	184	87	33	189	81	28	210	92	8.42
		204	204	152	55	28	57	28.9	60	157	53	53	177	57	36	194	69	6.7
		95	95	179	60	29.2	75	36.7	37	189	73	36	230	104	14	254	105	12.58
		107	107	194	59	25.8	96	41.8	17	216	105	35	223	90	37	250	120	8.75
		69	69	87	13	12.1	46	44.7	22	98	40	20	102	43	7	198	80	13.43
		186	186	158	50	25	66	32.9	55	166	72	44	194	74	17	214	87	9.19
		282	282	168	69	29.5	57	24.3	101	171	56	53	183	59	121	187	65	3.39
		167	167	156	49	27	69	38	48	178	72	44	191	79	52	213	90	9.21
		156	156	156	62	28.1	52	23.5	38	170	54	43	181	49	61	197	56	6.64
		110	110	195	62	25.2	94	38.4	21	218	102	25	210	92	31	238	104	6.02
		181	181	200	60	26.2	95	41.3	45	213	93	54	209	84	58	232	102	4.23
		61	61	152	40	22.5	71	39.6	14	168	76	10	211	85	7	189	95	9.13
GROUP AVERAGE		154	154	162	51	25	71	36	42	176	73	39	191	75	41	213	87	8.08
GROUP TOP				200	69	30	96	46		218			230			254		13.43
GROUP TARGET																		

# Herd EBI – Homebred Replacement Heifers.

Herd Details		Number home bred 1st calving replacements (based on birth year)												Ave EBI of home bred 1st calving replacements (based on birth year)										Annual		
Herd ID	Name	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Gain
		15	16	18	21	24	12	16	19	27	16	21	24	€109	€66	€101	€95	€121	€190	€168	€141	€156	€172	€175	€186	€3.6
		7	2	14		3	19	13	24	14	23	4	16	€35	€6	€83		€64	€18	€18	€80	€89	€72	€108	€104	€17.2
		13	14	29	36	36	28	26	25	19	28	28	16	€73	€90	€85	€76	€116	€116	€139	€150	€171	€171	€161	€177	€7.6
		17	18	21	26	18	30	25	25	25	22	23	24	€95	€106	€116	€99	€140	€145	€153	€166	€174	€146	€201	€203	€10.1
		25	30	33	32	34	32	41	27	41	30	34	35	€110	€89	€74	€97	€118	€134	€125	€175	€163	€177	€190	€182	€11.3
										45	56	65	86									€102	€123	€145	€163	
					8	7	23	30	31	18	20	29	41				€42	€119	€102	€105	€123	€143	€146	€158	€150	€9.0
		31	24	18	35	26	24	27	28	24	29	36	37	-€4	-€20	€75	€69	€66	€94	€111	€142	€144	€145	€144	€166	€11.0
												20	13											€152	€180	
		21	20	23	29	15	32	33	44	26	28	21	16	€81	€62	€99	€99	€107	€110	€120	€144	€149	€149	€174	€170	€10.0
		26	16	33	27	33	33	41	37	35	36	51	67	€69	€100	€105	€107	€138	€129	€141	€157	€161	€173	€164	€163	€4.3
		8	7	11	12	12	7	16	19	9	11	5	9	€79	€106	€101	€70	€137	€123	€133	€143	€149	€143	€158	€167	€6.9
		8	8	7	10	12	15	14	6	13	13	9	20	€61	€63	€100	€120	€88	€124	€139	€125	€151	€138	€173	€157	€3.7
Average		17	16	21	24	20	23	26	26	25	26	27	31	€71	€67	€94	€87	€111	€117	€123	€141	€146	€146	€162	€167	€8.6

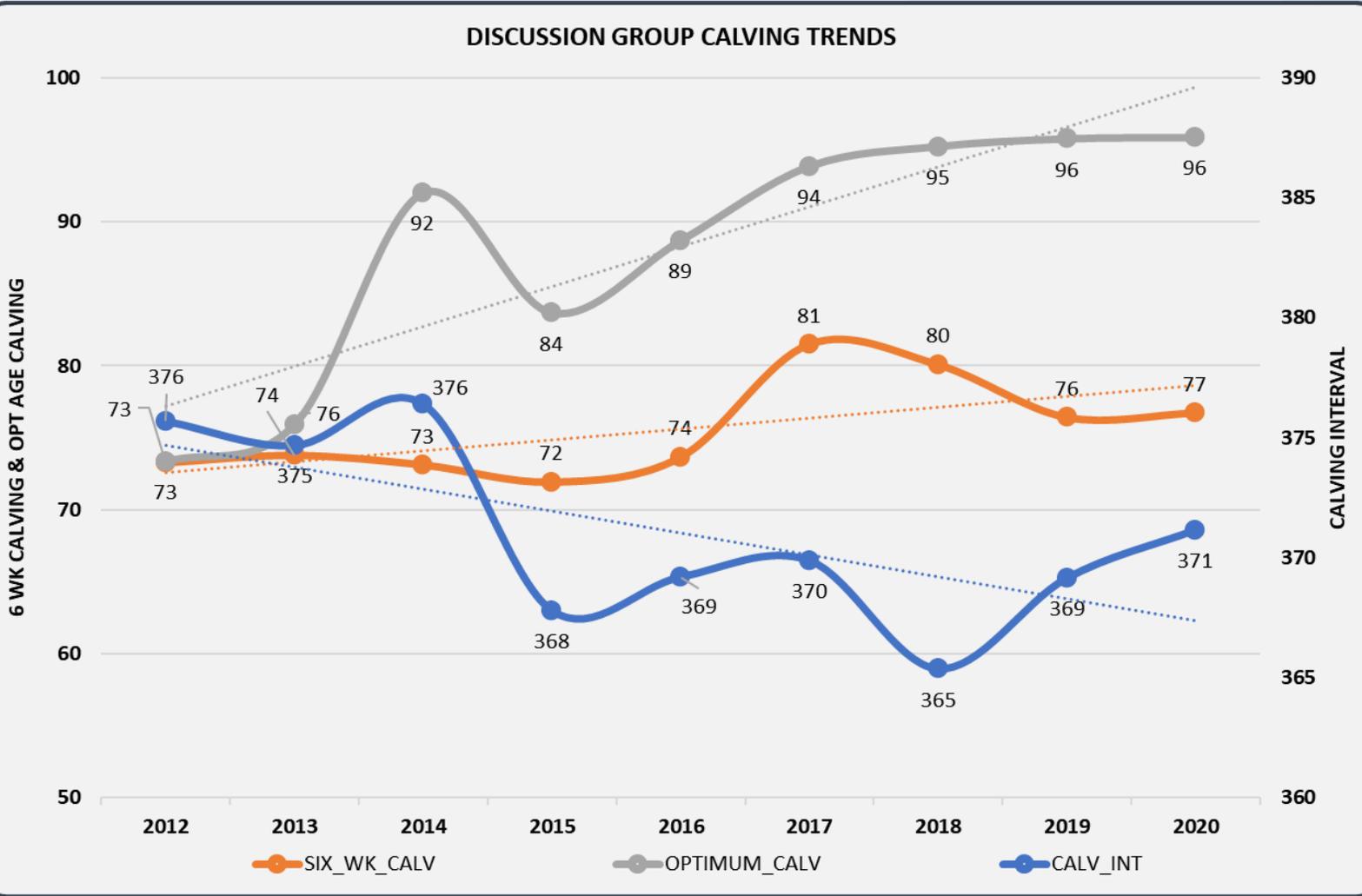
- Focusing on homebred replacement females => a more accurate way to assess progress.
- Average EBI of 1<sup>st</sup> calving heifers this year = €167 . Rate of gain in EBI now €8.6/year (based on last 5 years).

# Herd EBI Comparison for Group.



- Comparison based on 2336 herds that have had 5 homebred replacements calving each year since 2000 (Average & Top 100).
- Average EBI of 1<sup>st</sup> calving heifers for group is above the average of All herds (€167 vs €142). Average for top 100 is €198 (min is €190).
- Rate of gain is below for group (€8.6 vs €9.7 for national average).
  - More difficult at higher levels of herd/group EBI.
- How has this level of herd EBI and rate of gain translated into actual performance?

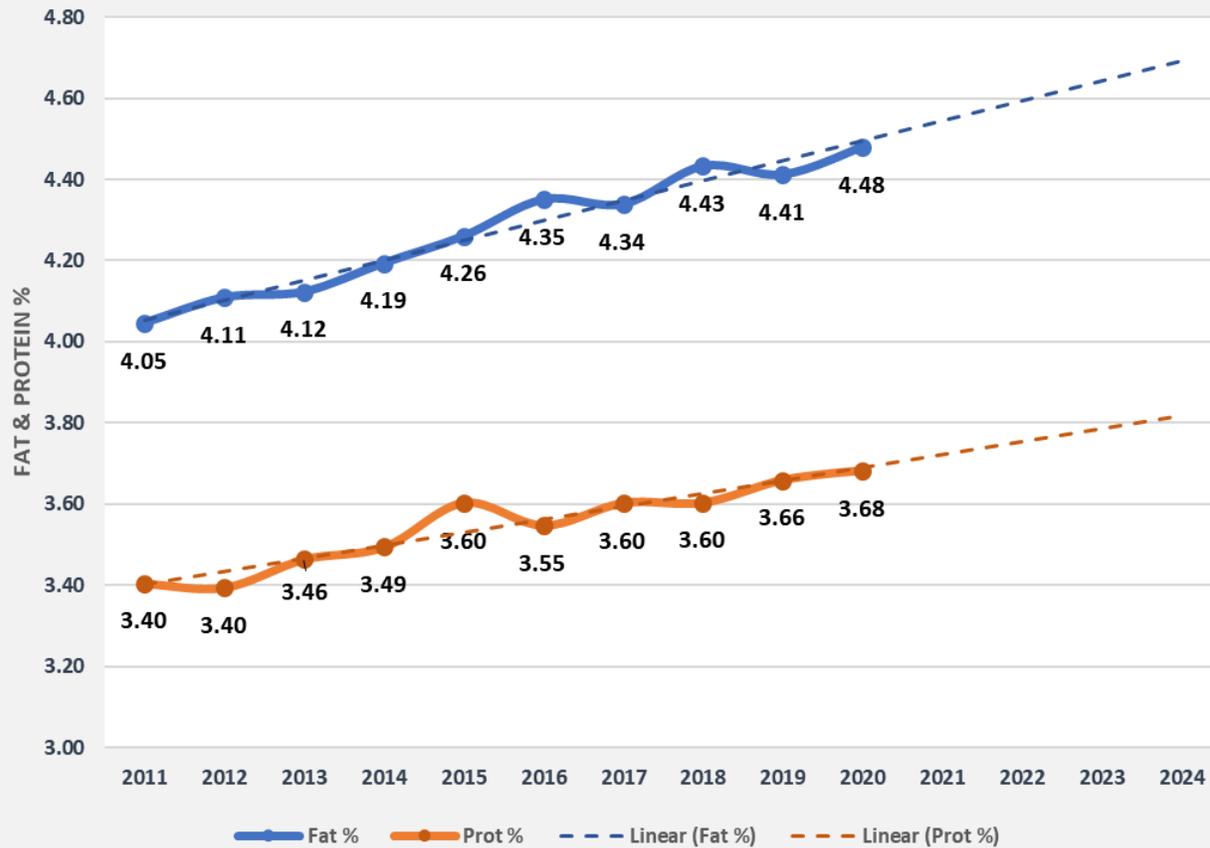
# Discussion Group Fertility Data



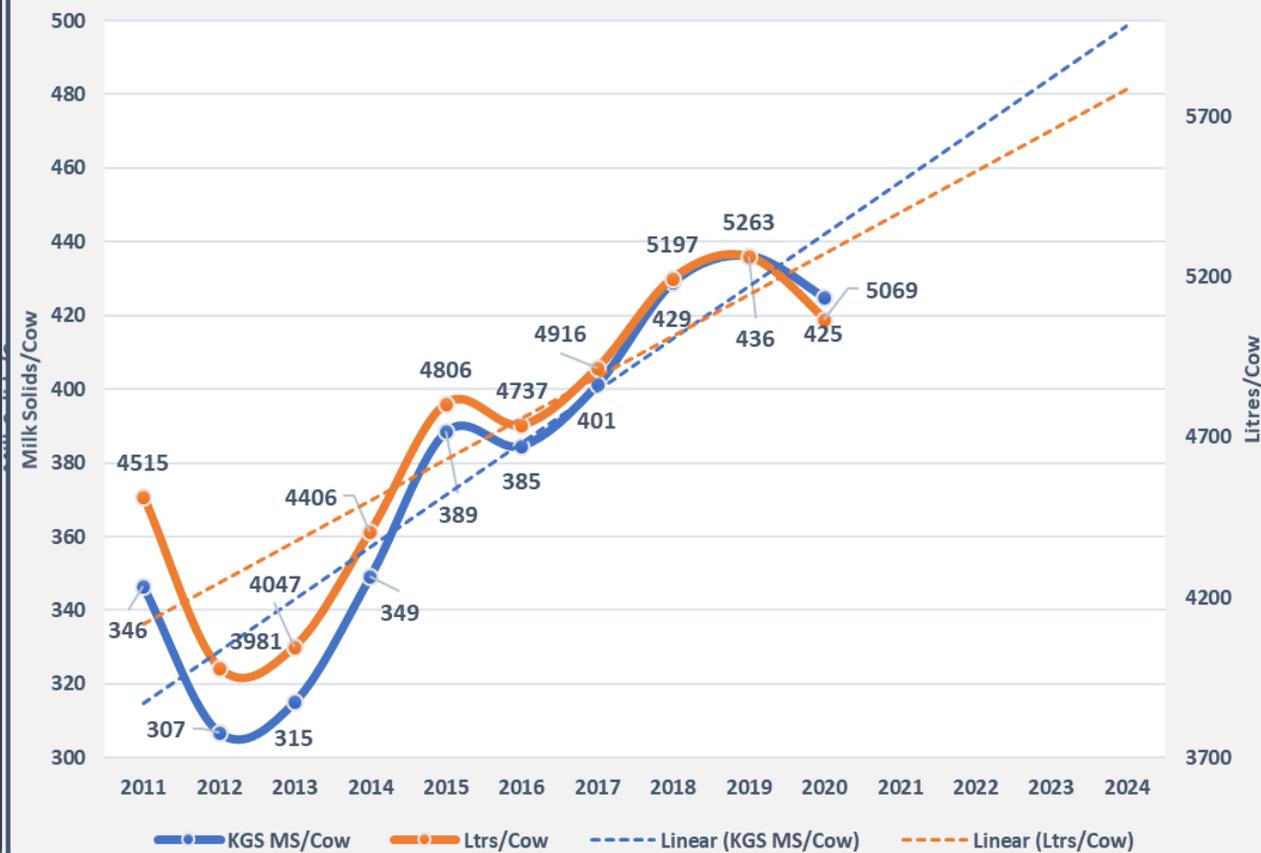
Year	Cows Calved	Repl. Rate	Average Parity	% Not Calved
2012	947	31	2.9	1.6
2013	1,091	30	3.0	1.8
2014	1,135	24	3.0	1.5
2015	1,235	25	3.1	1.6
2016	1,437	32	3.0	1.3
2017	1,525	24	3.2	0.1
2018	1,646	23	3.4	0.3
2019	1,736	22	3.4	1.2
2020	1,923	27	3.3	2.8

# Discussion Group Co-op Data

## Discussion Group Fat & Protein %



## Discussion Group Milk Solids & Ltrs/Cow



# Discussion – Past performance.

- EBI Trends?
- Average performance of group for key traits?
- Link with priorities?
- Others.....?

# Discussion Group Dairy AI Usage 2020

- 66 Different Dairy AI Bulls used across the Group
- Highest EBI Bull- FR5515 (IG) STONEPARK SERGI SRM €306
- Lowest EBI Bull FR4001 CARRICKSHOCK QUINT 3 €165
- Top 10 most used Bulls (Wt. Avg. EBI €256/Fert. €95)

Herd	NAME	Straws	Avg Team EBI	Avg Team Fert
		119	€267	€100
		57	€276	€85
		160	€280	€111
		104	€259	€102
		127	€274	€115
		202	€238	€91
		410	€269	€107
		166	€224	€76
		162	€224	€55
		126	€268	€111
		100	€261	€107
		358	€201	€68
		-	-	-
		-	-	-
<b>Grand Total</b>		<b>2,091</b>	<b>€248</b>	<b>€92</b>

		Straw no.	Av EBI	Av Fert.
1	FR4728 (IG) KILFEACLE PIVOTAL	117	€297	€104
2	ZSP PRIESTS SIERRA	116	€195	€63
3	FR4414 (IG) FAHA ANDREW	111	€271	€100
4	FR4513 (IG) BALLYGOWN ALBERT	111	€281	€76
5	FR4965 WOODWARDS SPOT ON	85	€189	€67
6	FR4439 (IG) DOONMANAGH SEVILLE	82	€250	€94
7	FR4547 KILLALOUGH SAMIR	82	€301	€124
8	FR5289 (IG) NEXTGEN PACKMAN SRM	71	€252	€137
9	JE6007 LYNBROOK KARTELL	67	€241	€76
10	FR5530 (IG) RATHLANNON ESMONDE	56	€282	€134

Average EBI of Top 75 Bulls on ICBF Active Bull List (Jan. 2021)  
 EBI: €255      Fertilty: €102

# Using High EBI Bulls Equally.

Herd ID	Name	Fem 2020	By AI	Num Bulls	Top Bull	Calves Top Bull	% Top	Name Bull	Brd	EBI	Fert SI	YOB
		38	35	12	FR2298	7	20%	(IG) OLCASTLETOWN RONALDO	HO	€221	€87	2015
		22	22	5	FR4510	8	36%	(IG) RONNOCO MILAN	HO	€233	€102	2017
		32	31	7	FR4800	8	26%	COOLEWEST THADY SRM	HO	€263	€105	2018
		36	34	10	FR4532	5	15%	(IG) CAHERAGH MAYSON	HO	€245	€57	2017
		62	57	6	FJM	13	23%	DOONMANAGH HMY MOSSY	HO	€218	€66	2013
		90	75	15	FR4481	15	20%	(IG) MONABROGUE EBONY	HO	€213	€62	2017
		58	56	7	FR2318	19	34%	BO-IRISH MRICE CARLINO-ET	HO	€201	€48	2013
		61	56	4	OKT	20	36%	OKURA LT INTEGRITY	JE	€201	€33	2010
		53	53	16	FR4776	8	15%	BELLAIR ANTON SRM	HO	€253	€103	2018
		35	35	7	FR4425	9	26%	KEALFINCHEON GLENNY	HO	€184	€62	2017
		92	92	13	ZSP	25	27%	PRIESTS SIERRA	HO	€199	€62	2010
		16	10	3	FR4673	5	50%	BEECHNUT DOVEA	HO	€243	€89	2017
		20	18	6	FR4154	5	28%	HAGGARD FRANKO	HO	€248	€103	2016
Average				<b>8.5</b>			<b>27%</b>					

- Analysis of AI bred heifer calves born in Spring 2020. 233k calves across 9.6k herds.
- On average farmers are using teams of bulls (8.4 on average) but still using 31% to the “top” bull.
- Group figures are 8.5 and 27% respectively.
- An area for further improvement by the group?

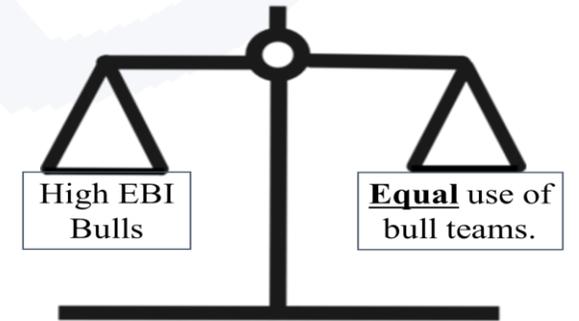
# Sire Advice Standard & Plus

**SIRE ADVICE**  
Manually Enter Bulls

START

**SIRE ADVICE PLUS**

START



- Sire Advice will assist you make more informed breeding decisions for your herd.
- Select a team of bulls based on your own breeding objectives.

HerdPlus EBI Scorecard	Your Herd	National Average	National Top 10%	Your National Rank	Star Rating <sup>1</sup>
<b>Herd EBI</b>	<b>€134</b>	€118	€156	75%	****
<b>Milk Sub-Index</b> (Milk, Fat & Protein)	<b>€59</b>	€36	€54	96%	*****
<b>Fertility Sub-Index</b> (Calving Interval & Survival)	<b>€45</b>	€55	€71	33%	**
<b>Calving Sub-Index</b> (Gestation, Calving Difficulty, Mortality)	<b>€25</b>	€25	€34	62%	****
<b>Beef Sub-Index</b> (Carcass Weight, Conformation & Fat)	<b>€-13</b>	€-10	€-6	23%	**
<b>Maintenance Sub-Index</b> (Cow Liveweight)	<b>€13</b>	€13	€19	52%	***
<b>Management Sub-Index</b> (Milking speed & Temperament)	<b>€2</b>	€1	€3	72%	****
<b>Health Sub-Index</b> (SCC, Mastitis, & Lameness)	<b>€1</b>	€3	€5	24%	**

## Guidelines for Bull Team Usage

Herd Size (Incl. Heifers)	Recommended minimum number of Bulls
0-50	7
50-100	7
100-150	8
150-200	10
200-250	11
250-300	12
300-350	13
350-400	14

- The mating program generates the best matings to maximise the genetic gain in your herd.
- Minimises variation between Milk and Fertility while eliminating any Inbreeding risk.
- All Sire advice matings can be uploaded to AI technician handhelds & printed on breeding charts.

# Discussion - Sires Used.

- Average EBI?
- Relative to stated goals/targets?
- Equal usage of bull teams?
- Others.....?

# ICBF Active Dairy Bull List.

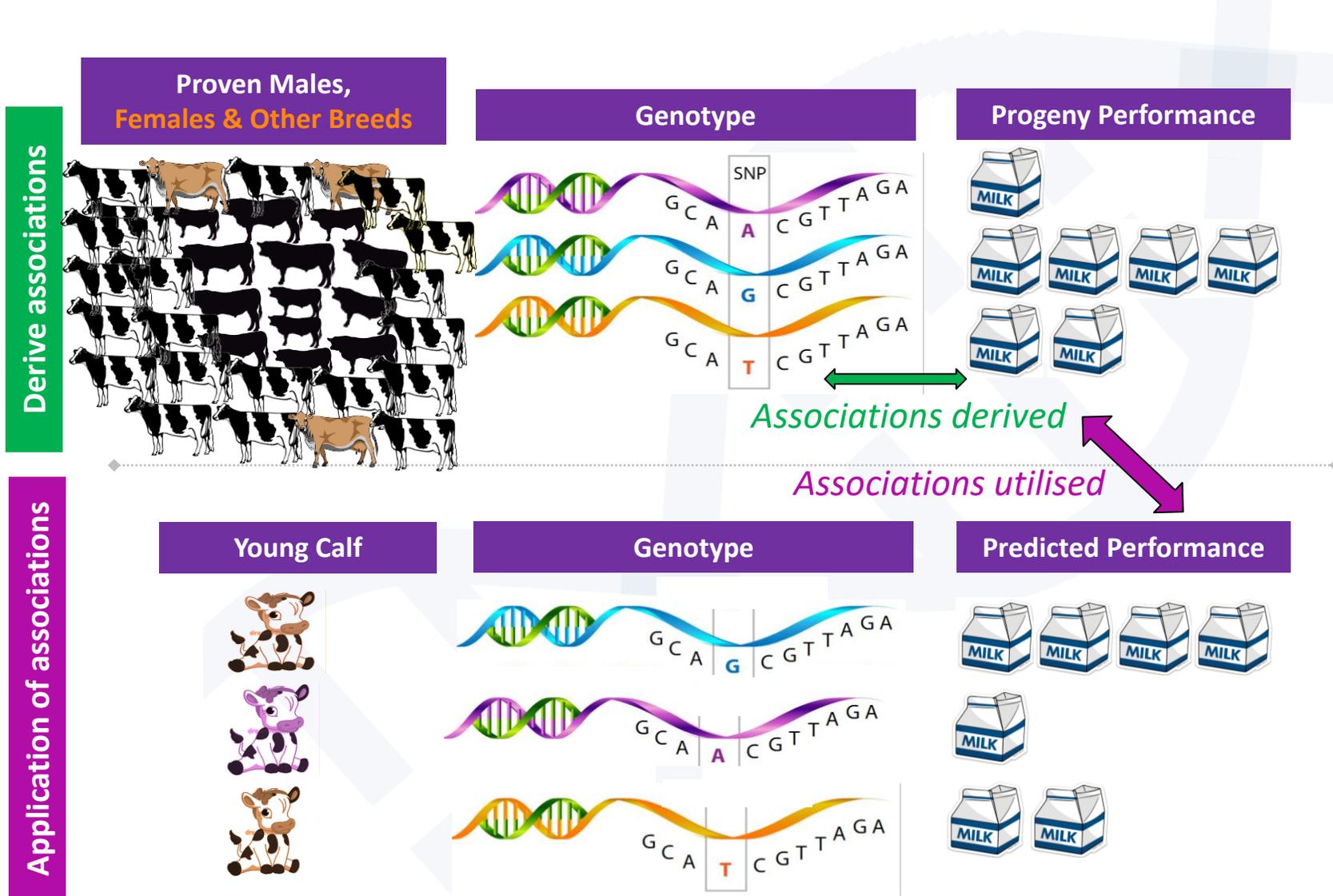
## ICBF Dairy Active Bull List

(Printed 07/12/2020)



Animal Details								EBI Details			EBI Sub Indexes							Key Profit Traits						Calving Difficulty Details						Semen Details				
Rank	Code	Bull Name	Sire	Brd	Status	HO %	GI	EBI	Rel %	Proof	Milk	Fert	Calv	Beef	Maint	Mgmt	Hlth	M Kg	F Kg	P Kg	F%	P%	CI	SU%	M.Tim	Risk of Dairy Heifer CDiff	Dairy Heifer CD%	Dairy Heifer CD% Rel (%)	Dairy Cow CD%	Dairy Cow CD% Rel (%)	Dairy Calv Recs	Avail	Price	Supplier
1	FR4728	(IG) KILFEACLE PIVOTAL	LWR	HO	PED	81	Yes	314	84	GS	129	114	59	-12	15	6	4	364	22.02	19.69	.13	.12	-6.51	2.54	-10.16	Low	4.7	87	2.1	98	2002	Medium	22	NCBC
2	FR4478	(IG) SPRINGHAVEN NUA	PHC	HO	PED	88	Yes	298	81	GS	47	181	41	-2	13	7	11	-181	4.73	3.47	.21	.17	-12.99	1.44	-15.1	Low	4.9	68	2.1	89	296	High	20	NCBC
3	FR5112	BREANSHAMORE ALLIE SRM	FR2239	HO	SRM	75	No	293	83	GS	95	123	57	-1	10	3	6	291	17.27	14.57	.10	.08	-7.68	2.08	-16.84	Low	4.1	79	1.9	90	371	High	21	Eurogene /LIC
4	FR4547	(IG) DOONMANAGH SEVILLE	FR2249	HO	PED	78	No	291	83	GS	115	127	57	-15	2	4	1	-7	15.43	13.94	.27	.25	-7.03	3.12	.98	Low	5.7	93	2.3	96	1456	High	20	NCBC
5	FR4513	(IG) BALLYGOWN ALBERT	FR2249	HO	PED	72	Yes	290	85	GS	137	92	53	-8	3	7	6	344	22.88	20.55	.16	.15	-3.57	3.8	-6.03	Low	6.8	97	2.6	99	11196	Medium	22	NCBC
6	FR4785	GLENABOY RONALD	FR2298	HO	PED	78	No	283	82	GS	124	88	48	-5	6	6	15	132	22.5	15.21	.30	.18	-4.54	2.48	9.47	Low	4.0	92	2.0	97	1564	High	19	Dovea
7	FR4582	(IG) FOXVIEW BOND	FR2239	HO	SRM	78	No	282	83	GS	75	146	53	-2	7	5	-2	135	13.64	10.07	.14	.09	-8.75	2.88	-6.78	Low	4.4	67	2.1	90	355	High	20	NCBC
8	FR5127	BRIDEPARK MAGIC 0984 SRM	FR4244	HO	SRM	75	Yes	280	89	GS	103	126	43	-21	21	-2	12	174	13.01	15.52	.11	.16	-8.63	1.36	-6.17	Moderate	8.0	73	3.1	81	137	High	19	Eurogene /LIC
9	FR5133	KILDARRA MAJOR	FR4242	HO	PED	78	Yes	278	81	GS	87	140	45	-14	14	6	1	70	14.71	10.59	.21	.14	-9.09	2.08	-3.95	Moderate	6.7	68	2.5	90	339	High	19	Eurogene /LIC
10	FR4845	BALLYBRIDE QUEBEC SRM	AZG	HO	SRM	69	Yes	276	82	GS	87	125	37	-19	21	19	7	-26	10.15	10.75	.20	.2	-7.07	2.89	-34.82	Moderate	6.4	65	2.4	91	409	High	14	Bova AI
11	FR4467	(IG) CURRA BOSS	FR2385	HO	SRM	69	No	276	84	GS	59	153	55	-8	12	3	2	-2	13.49	5.24	.24	.09	-9.8	2.38	-21.12	Low	6.4	93	2.3	94	942	High	20	NCBC
12	FR4482	(IG) SPRINGHAVEN SUPREME	LWR	HO	PED	72	Yes	273	84	GS	85	137	46	-9	4	2	8	172	11.47	13.24	.08	.13	-8.65	2.28	-15.96	Moderate	7.1	80	2.7	98	2799	High	20	NCBC
13	YKA	(IG) ARDKYLE MOUNT EVERET	LHZ	HO	SRM	75	Yes	267	83	DP-IRL	87	120	49	-15	14	2	12	-26	13.76	9.48	.26	.18	-5.14	4.41	-4.87	Low	5.9	96	2.4	99	3979	High	19	NCBC
14	FR4788	SCORDUFF NEART	FR2314	HO	PED	88	No	266	81	GS	115	92	35	-11	11	2	23	54	22	12.69	.34	.19	-4.7	2.63	-4.83	Low	6.0	56	2.5	91	403	High	22	Dovea
15	FR5118	LISNAKELLY CYCLONE	PHC	HO	PED	84	Yes	265	82	GS	104	92	54	-11	10	0	16	165	15.5	14.81	.15	.16	-3.89	3.49	-15.98	Low	4.3	59	2.2	92	432	High	21	Eurogene /LIC

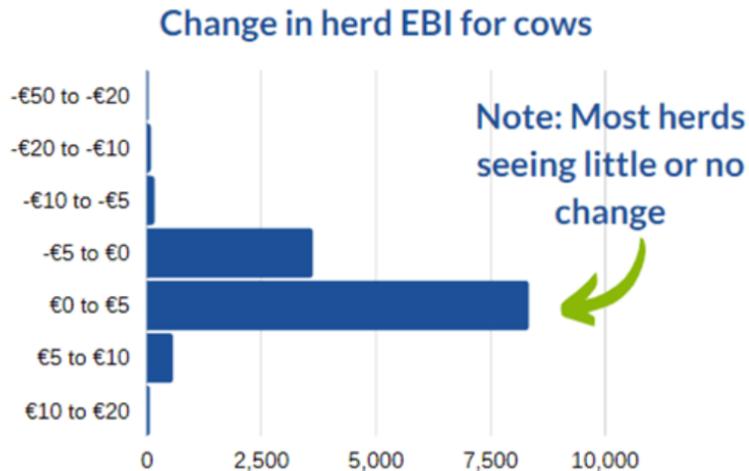
# Training Population Update



## Updated Training Population

- ~40,000 genotyped males & Females with lots of progeny information used to derive association between DNA and performance
- *SNP A = 1 milk carton*
- *SNP G = 4 milk cartons*
- *SNP T = 2 milk cartons*
- The performance of young genotyped animals with no performance of their own is predicted from the associations of the training population
- These animals are more representative of the current population and provide lots of useful information to derive the predictions of genotyped animals.

# Dairy Genomic Changes (2020).

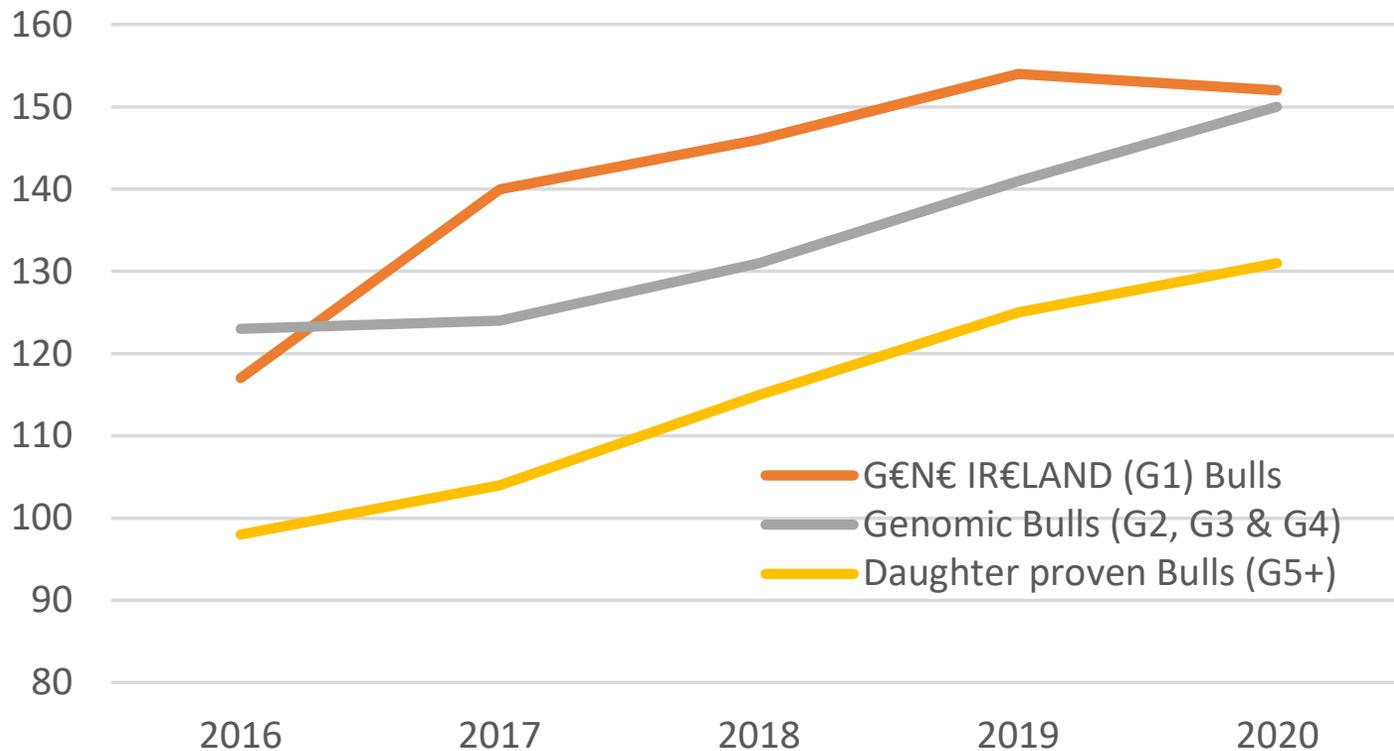


- New training population (females + multi-breed) introduced in Jan 2020.
  - More data on which to help identify outlier's (relative to parent average). But will also introduce some bias (i.e., now using more relevant animals in training population, but they have lower rel proofs).
- Potential for additional bias identified and a “fix” applied (Oct 2020).
- Minimal impact on herd/cow proofs.
- Some impact on Active Bull List, e.g., -€23 for current Top 75 bulls.
- Impact highest in genotyped young calves born in 2020.
- Overall => very positive from a genetic gain perspective.

Change in Bulls on ICBF Active Bull list.									
Bull Details				New Oct 2020			Old Aug 2020		
Rk	Tag	Name	Prf	EBI	Milk	Fert	EBI	Milk	Fert
1	FR4728	(IG) KILFEACLE PIVOTAL	GS	€310	€124	€114	€345	€112	€164
2	FR4478	(IG) SPRINGHAVEN NUA	GS	€299	€46	€184	€275	€29	€179
3	FR4785	GLENABOY RONALD	GS	€295	€127	€95	€284	€102	€108
4	FR4547	(IG) DOONMANAGH SEVILLE	GS	€289	€111	€127	€343	€106	€184
5	FR4513	(IG) BALLYGOWN ALBERT	GS	€289	€135	€95	€322	€127	€135
6	FR4582	(IG) FOXVIEW BOND	GS	€287	€75	€149	€322	€72	€186
7	FR5133	KILDARRA MAJOR	GS	€286	€92	€140	€314	€91	€173
8	FR4467	(IG) CURRA BOSS	GS	€279	€62	€156	€294	€63	€173
9	FR5112	BREANSHAMORE ALLIE SRM	GS	€278	€85	€119	€296	€78	€143
10	FR4482	(IG) SPRINGHAVEN SUPREME	GS	€274	€88	€138	€346	€78	€226
<b>Average Top 10 Active Dairy Bulls</b>				<b>€289</b>			<b>€314</b>		
<b>Average Top 75 Active Dairy Bulls</b>				<b>€255</b>			<b>€278</b>		

# Younger GS or Older Daughter Proven bulls?

Fig 1. Genetic Trends for Different Groups of AI Sires, based on progeny EBI.



Category	2016	2017	2018	2019	2020
G€N€ IRE (G1)	6,823	11,390	18,688	20,189	14,803
GS (G2, G3 & G4)	90,305	107,956	118,932	119,771	138,741
Daughter proven	84,418	72,336	63,875	60,640	52,204
Total	183,562	193,699	203,513	202,619	207,768
% genomics	53%	62%	68%	69%	74%

- Average EBI of 1<sup>st</sup> calving heifers (n=313k) = €135.
- Progeny of Genomic Sires (G1 & G2/G3/G4) are consistently ahead of daughter proven bulls (~€25 across the 5 years).
  - Equivalent to ~3-4 years of genetic gain.
- Progeny of younger sires have a higher EBI => makes sense.
- Average EBI of stock bulls => €80. Still 30% of dairy replacements by stock bulls....!

# Relationship between herd EBI and preparedness to use younger GS sires.

% progeny by G1 Sires	Herds	Cows	% by G1 Sires	% by GS Sires	Gen Int Sires	Count 2018 Heifers	EBI 2018 Heifers
- Greater 20%	487	140.0	29%	83%	47.7	31.1	€164.6
- 10 to 19%	893	142.8	14%	73%	56.9	30.6	€151.5
- 5 to 9%	1113	131.5	7%	69%	61.4	26.4	€145.7
- 1 to 5%	1850	121.5	2%	64%	66.8	23.3	€140.2
- Zero %	1847	98.6	0%	54%	74.3	19.1	€133.7
Overall	6190	121.0	6%	65%	65.1	24.3	€142.8

- Analysis based on 6190 herds that had  $\geq 30$  AI bred cows and  $\geq 5$  AI bred replacements this year (i.e., born in 2018 and calves in 2020).
- % progeny from G1 sires = 6%. % progeny from GS sires = 65%. Ave EBI 2018 born heifers and calved in during 2020 = €142.
- Clear relationship between herds preparedness to use young GS sires (i.e., G1 bulls) and herd EBI. Is this an area for the group to consider in the future?

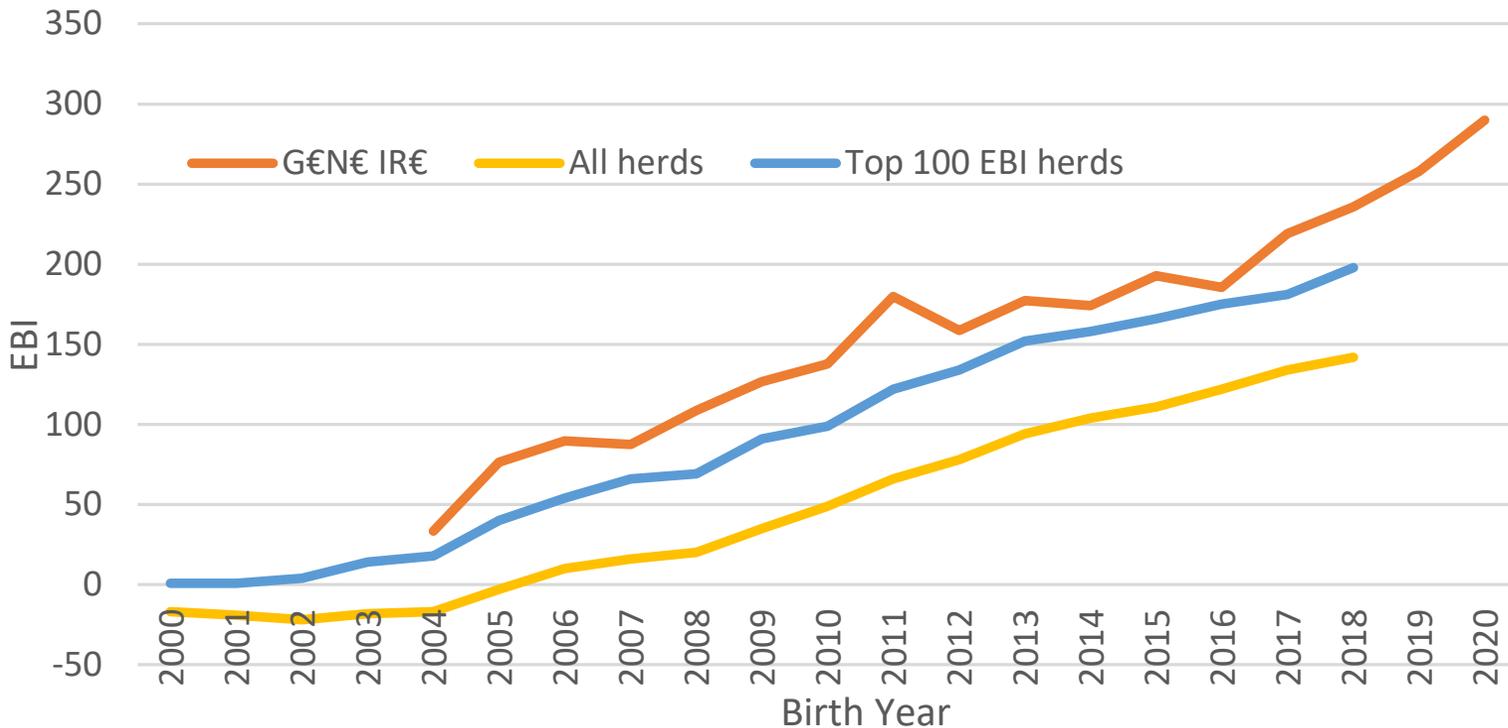
# Number bulls & young GS Bulls; Group.

Herd ID	Name	Cows	By AI	Num AI Sires	% AI	% G1	% GS	% DP	Gen Int Sire	%HO	%FR	%JE	%Red	2018 hfrs	2018 EBI	5 yr Gain
		73	72	37	99%	35%	90%	10%	40.9	72%	27%	0%	0%	24	€186	€3.6
		57	6	3	11%	0%	17%	83%	92.4	46%	51%	0%	1%	16	€104	€17.2
		154	133	44	86%	5%	66%	34%	64.6							
		103	100	40	97%	25%	75%	25%	49.2	54%	29%	16%	1%	16	€177	€7.6
		103	78	36	76%	15%	78%	22%	48.4	62%	34%	3%	0%	24	€203	€10.1
		149	134	38	90%	10%	69%	31%	54	70%	28%	1%	0%	35	€182	€11.3
		250	153	44	61%	3%	73%	27%	53.6	65%	23%	7%	3%	86	€163	
		157	119	47	76%	0%	31%	69%	77.8	56%	20%	22%	1%	41	€150	€9.0
		140	140	37	100%	1%	38%	62%	76.4	38%	16%	45%	1%	37	€166	€11.0
		130	109	48	84%	15%	73%	27%	56.7	73%	24%	1%	1%	13	€180	
		141	135	34	96%	25%	65%	35%	59.1	65%	29%	5%	0%	16	€170	€10.0
		183	183	35	100%	0%	41%	59%	71.7	40%	17%	41%	0%	67	€163	€4.3
		62	54	25	87%	0%	63%	37%	67.8	59%	38%	1%	0%	9	€167	€6.9
		60	59	29	98%	2%	28%	72%	72.5	51%	41%	2%	3%	20	€157	€3.7
Average					83%	10%	58%	42%		58%	29%	11%	1%			

- Group are well above the National average figures for G1 sire usage (10% versus 6% Nationally).
- Herds that have higher G1 sire usage generally have higher EBI's for 2018 heifers.
- Is this something that other group members would consider in 2021?

# Why G€N€ IR€LAND?

Genetic Trends for G€N€ IR€LAND Bulls, Top 100 EBI Herds and All Herds.



- Perception that G€N€ IR€LAND bulls are “cheap test bulls”. NO, they are the latest generation of highest EBI young bulls!
- Test ~50 bulls/year across ~600 herds in partnership with AI companies.
- Seeking to double test bull capacity for Spring 2021 => 100 bulls with an expected EBI of **~€290**. Note current ICBF Active Bull List is **€255**.
- Attractive incentives for participants, e.g., reduced priced semen, reduced price genotyping & sire advice.
- Ensures that we have accurate data on ALL young bulls (not just the highest EBI bulls). Critical for; (i) identifying outliers (especially for new traits) & (ii) ensuring greater accuracy of future genomic predictions.

# Discussion – Genomics & GENE IRELAND.

- Group usage of genomics?
- Daughter proven versus genomic?
- Participation in GENE IRELAND?
- Others....?

# Current priority areas; Female fertility.

## Fertility KPI for national dairy herd

Table 1: Fertility traits in the national dairy herd (2019)			
Key Performance Indicators (KPI's)	Average	Top 5%	Btm 5%
Calving Interval (days)	390	363	444
Six-Week Calving Rate	65%	90%	25%
Calves per Cow per Year	0.91	1.02	0.68
Females not Calved in Period	8%	0%	26%
Current Replacement Rate	20%	18-22%	N/A
Cows Culled/Slaughtered in Period	21%	N/A	N/A
Recycled Cows	13%	0%	42%
Potential Replacement Rate	26%	N/A	N/A
% of Heifers calved 22-26 mths of age	69%	100%	0%

Source: ICBF website. Data based on 13,902 herds

2019 average

**CIV = 390 DAYS**

**6WKCR = 65%**

While fertility trends are going in the right direction, the KPI's for fertility measures are a considerable way off targets set.

**TARGET**

**CIV = 365 DAYS (-25D)**

**6WKCR = 90% (+15%)**

- Calving interval and survival have worked well in the past.
- “Indicator traits” => goal traits are compactness of calving & infertile rate.
- These traits work well when herd fertility is below average.
- Work underway to now redefine new fertility traits for the future.

# Current Priority Areas; The Dairy-Beef Cycle

## Bull focus

• Supplies what the market demands:

- Easy calving
- Short gestation
- Carcass merit??



## Calf focus

- Cheap, healthy calf
- Good conformation
- Must generate return for investment

- The dairy-beef cycle is not the problem of the other person – all parts of the system are interrelated
- All parties need to consider their role in producing a viable animal for the dairy-beef system

## Cow focus

- Return to parlour
- Get back in-calf
- Sell calf quickly for good price



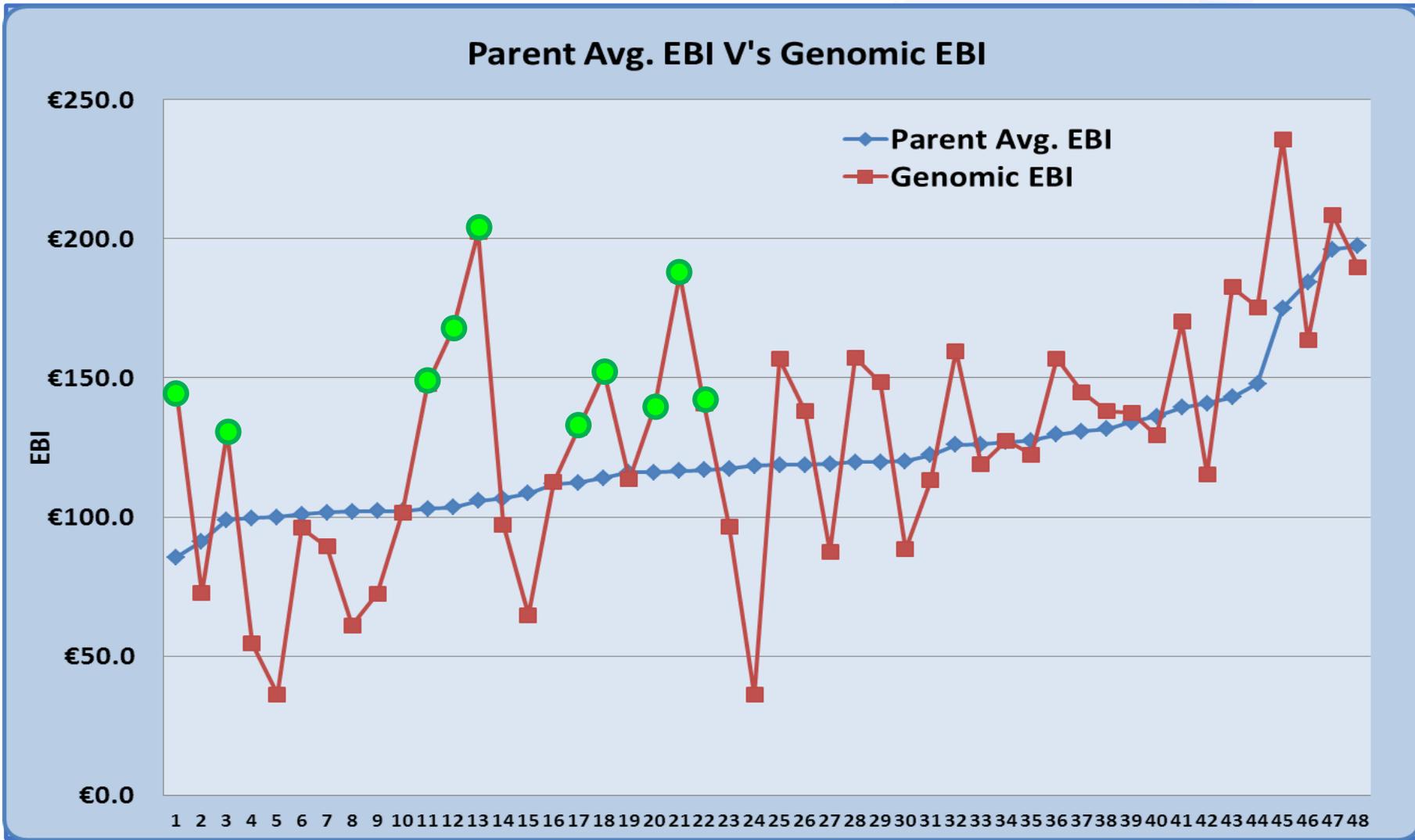
# Current priority areas; Genotyping Females

- Increase EBI reliability ~25%
- Heifers can change by +/- €90
- More accurate breakdown of sub-indexes.
- Correct any parentage errors ~10-15%
- More accurate matings using Sire Advice.

**Dairy Genomic Evaluation Report**

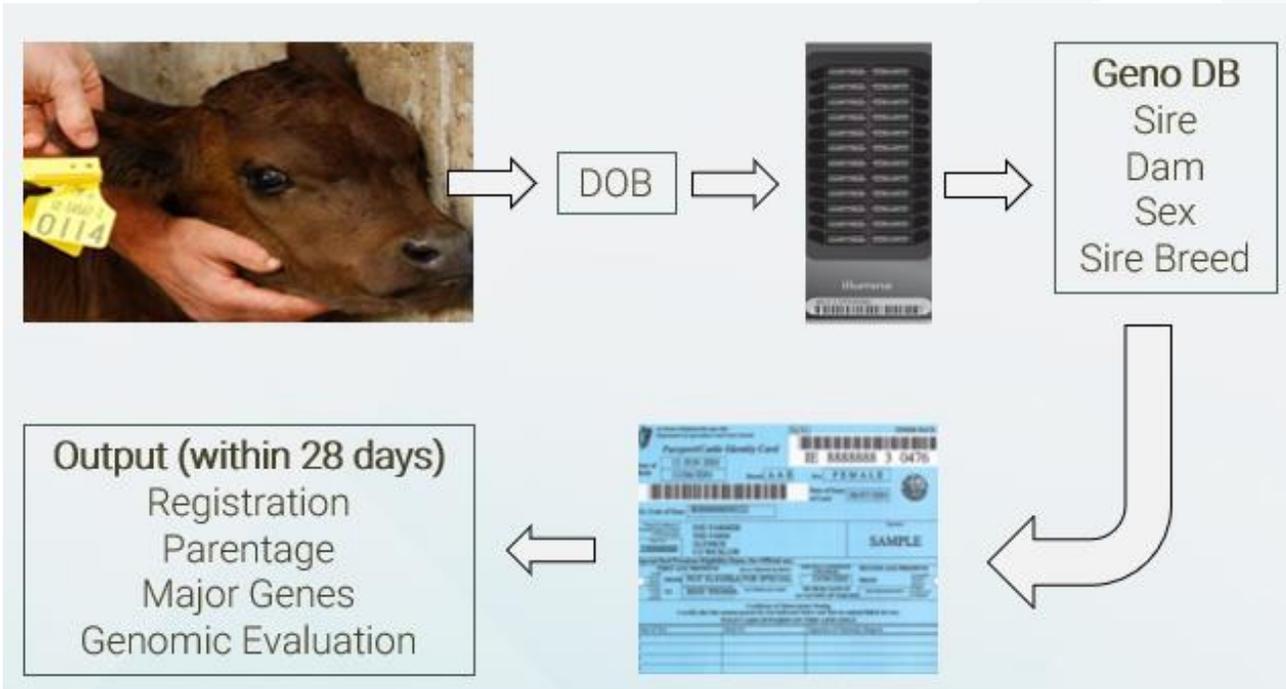
<b>Jumbo/DOB</b>	2806	06-Mar-2020	<b>Breed</b>	HO (88%), FR (13%)				
<b>Tag/Sex</b>	372222061972806	F	<b>Sire</b>	FR4728 (€371)				
<b>Name</b>			<b>Dam</b>	IE151013782104 (€154)				
<b>Date of Evaluation</b>	02-Apr-2020 (Evaluation valid until 26-May-2020)		<b>MGS</b>	FR2032 (€208)				
<b>Index</b>	<b>Official Genomic Evaluation (*)</b>	<b>Reliability</b>	<b>Weighting on Genomics</b>	<b>DNA Value</b>	<b>Parent Average Evaluation</b>	<b>Reliability</b>	<b>Diff. from Parent Avg</b>	<b>Increase In Reliability</b>
<b>EBI €</b>	<b>251</b>	<b>62%</b>	46%	252	262	36%	-11	26%
Milk Sub Index €	99	86%	80%	109	110	45%	-11	41%
Fertility Sub Index €	101	56%	48%	103	92	33%	+9	23%
Calving Sub Index €	57	53%	24%	44	53	36%	+4	17%
Beef Sub Index €	-7	38%	0%	0	-8	24%	+1	14%
Maintenance Sub Index €	7	37%	0%	0	9	23%	-2	14%
Management Sub Index €	2	50%	0%	0	5	29%	-3	21%
Health Sub Index	-7	56%	38%	-4	1	34%	-8	22%

# Current priority areas; Genotyping Females



- 48 replacement heifers genotyped with 22 to sell.
- Big variation in EBI's after genotyping.
- 10 animals that would have been sold are now retained!
- Cost €22/animal
- ~4:1 return on investment.

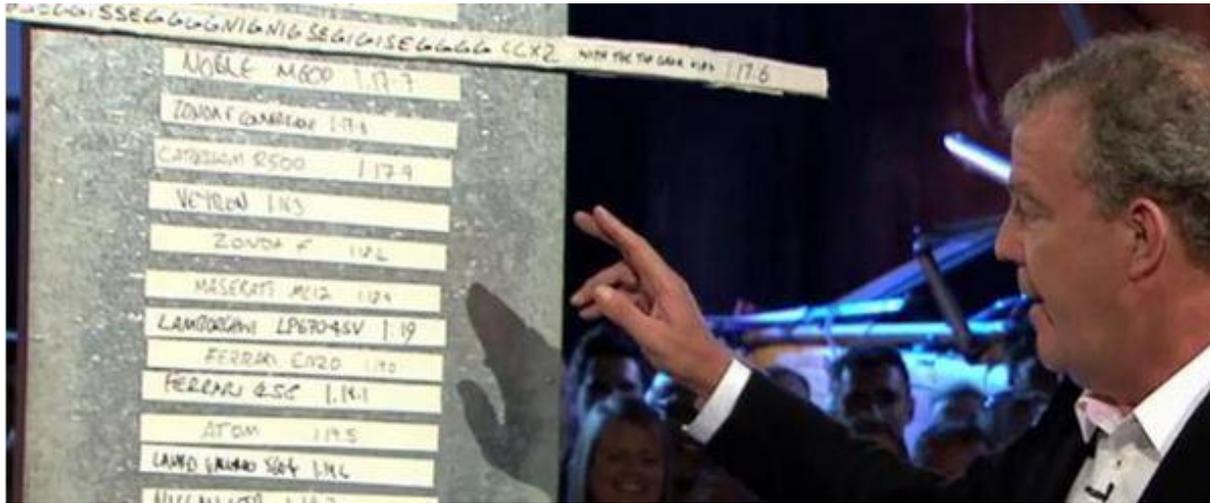
# Current priority areas; Genotyping.



- Each €10 increase in EBI => 61.7 kg CO<sub>2</sub> less per lact.
  - Can we utilise genomics to help us go faster?

- Current project with 400 herds where cow herd is fully genotyped and then registering resultant calves at birth based on DNA.
  - Farmer tags calf and submits DNA (from tissue tag, database works out parents!
- Cost of genotyping is €20 & decreasing.
- Can we transition our National cattle herd to DNA based calf registration over next 5 years?
- Real benefits associated with genetic gain, traceability, labour saving etc.

# The EBI Group Leader Board!



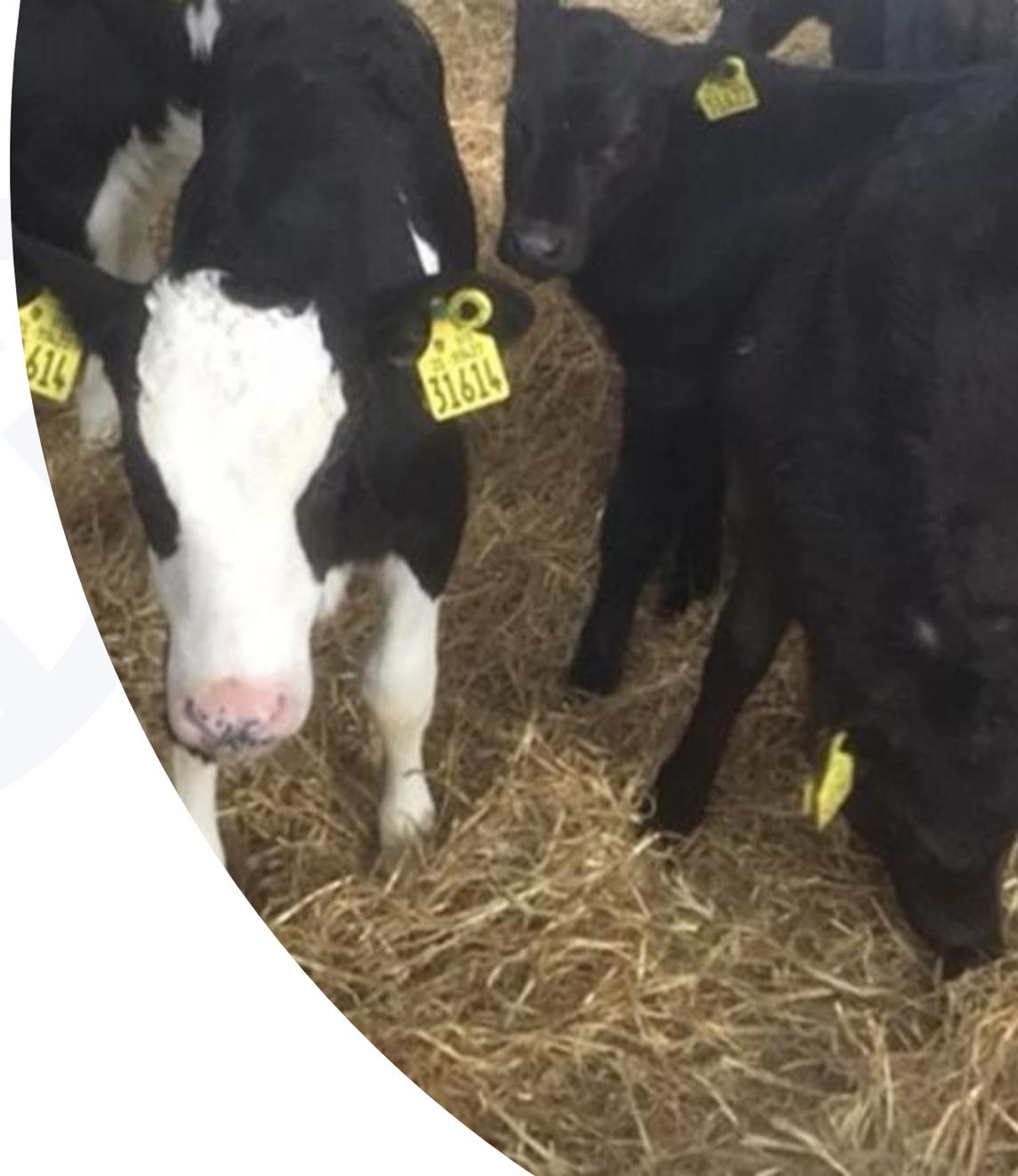
- Over the course of the next 2-3 months, we expect to meet 80-100 groups.
- Can we create a few KPI's and acknowledge the group that are best for each => Your up there till your knocked off.
- **All group data will be kept confidential**, except if you are a KPI leader.
- Your relative rank for each KPI's will be shared with the group (confidentially) at the end.
- A bit of fun.....with the opportunity to undertake some benchmarking and opportunities for improvement.

KPI	Figure	Group
EBI Heifers	€175	.....
EBI Gain	€11.5	.....
6 wk calving	.....	.....
.....		

# Summary & Actions for Dairy Discussion Group for 2021

---

- Good progress re: EBI, rate of gain & herd performance. Well done!
- Areas for future action/consideration;
  - Move to 100% dairy AI.
  - More high EBI bulls evenly on your herd => Sire Advice can greatly help this.
  - Consider using more young GS bulls => participation in G€N€ IRELAND.
  - Consider genotyping females => opportunity to accelerate genetic gain for your herd.
- Best wishes for the Spring 2021 calving & breeding season.



# Our Farmer & Government Representation



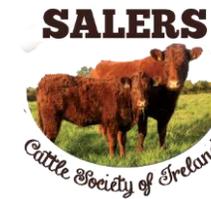
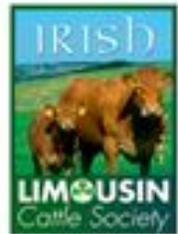
An Roinn Talmhaíochta,  
Bia agus Mara  
Department of Agriculture,  
Food and the Marine



# Our AI & Milk Recording Organisations



# Our Herdbooks



MRI Cattle Society of Ireland  
Meuse Rhine Issele -- Milk & Muscle!



Norwegian Red Cattle Society



# Acknowledging Our Members



# Extra Slides for use with groups that have cross-breeding herds.

**Date: Spring 2021**



An Roinn Talmhaíochta,  
Bia agus Mara  
Department of Agriculture,  
Food and the Marine



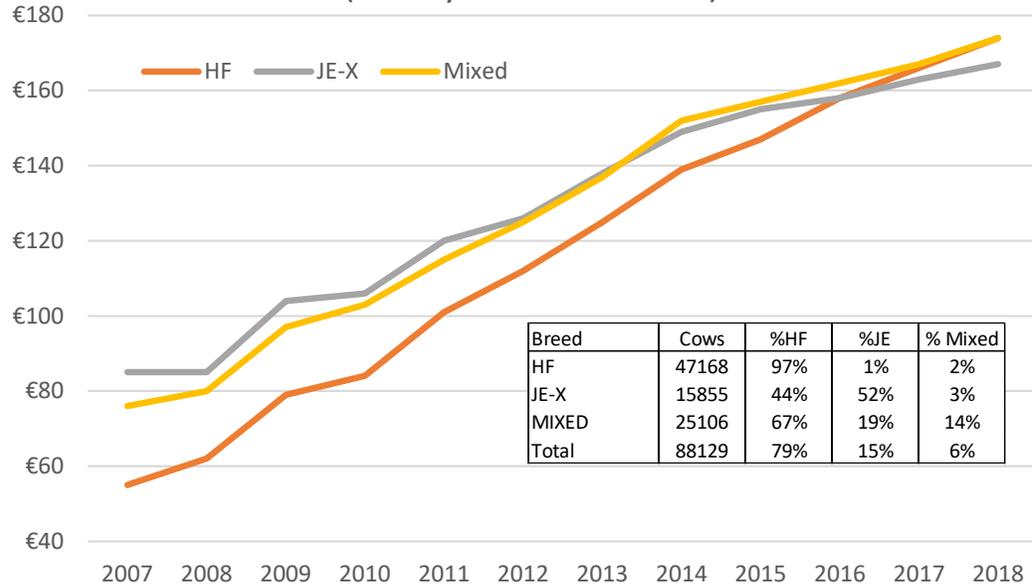
AgTech - it's in our DNA

# Multi-breed analysis of Group data.

- Feedback from several large groups with high numbers of cross-breeding members, is that they have not seen the continued improvements in female fertility in more recent years?
- Is there a problem with the EBI, with the underlying trait evaluations, a function of expansion, or is it related to something else?
- Data taken from 11 “multi-breed” groups i.e., groups where a large number of the members have been cross-breeding.
- Analysis based on records from 88,129 cows that were; (i) born on these farms between 1<sup>st</sup> Jan 2007 and 30 June 2018, (ii) were returned onto the farms as female replacements and (iii) had a sire recorded.
- For the analysis, breed was defined on following basis; (i) HF (>88% HF genes), (ii) JE-Xbred (>=40% JE genes) and (iii) Mixed breeds (remainder, including cows with red breeds).

# Analysis of data from multibreed groups.

F1. EBI Trends for Cows calving onto Group Herds (birth years 2007-2018)



T1. Genetic Trends for Cows on "Group" Farms.

Year	Holstein Friesian				Jersey X-bred				Mixed Breeds			
	Cows	EBI	Milk	Fert	Cows	EBI	Milk	Fert	Cows	EBI	Milk	Fert
2007	3695	€55	€17	€19	285	€111	€35	€42	752	€76	€11	€42
2008	3758	€62	€20	€21	250	€85	€24	€27	935	€80	€13	€41
2009	3739	€79	€23	€32	953	€104	€36	€36	1055	€97	€20	€48
2010	3846	€84	€24	€34	1276	€106	€34	€38	1183	€103	€20	€53
2011	3848	€101	€32	€40	1865	€120	€44	€35	1555	€115	€28	€54
2012	3668	€112	€33	€48	1751	€126	€50	€35	1695	€125	€34	€55
2013	3982	€125	€38	€54	1535	€138	€52	€43	2438	€137	€44	€54
2014	4019	€139	€43	€60	1326	€149	€57	€50	2702	€152	€50	€60
2015	3940	€147	€48	€63	1294	€155	€60	€48	2914	€157	€54	€61
2016	4295	€158	€51	€69	1414	€158	€63	€52	3323	€162	€58	€63
2017	4205	€166	€53	€73	1745	€163	€67	€52	3426	€167	€59	€64
2018	4173	€174	€53	€78	2161	€167	€70	€54	3128	€174	€60	€67

- Steady rate of genetic gain across all three groups. Rate of gain fastest for Holstein Friesian Group.
- Rate of gain for Jersey X-bred group has tapered off in more recent years, especially for female fertility traits. Why?

# Popular & high EBI bulls.

**T3. Top 10 EBI most heavily used bulls used by the Groups.**

Count	Code	Name	YOB	Breed	EBI	Milk	Fert	Maint	Dtrs	Semen Seller
1665	PSQ	PRIESTS SOLARIS-ET	2007	JE	€201	€62	€65	€26	9187	EURBULLS
1331	BGJ	BAGWORTH PF GRANDEUR S1F	2009	HO	€232	€70	€101	€20	7617	EURBULLS
1273	SEW	SEAROAD AWS PAMELA 1	2013	HO	€177	€21	€96	€24	12033	SEBULLS
1096	OKM	OKURA LIKA MURMUR S3J	2005	JE	€171	€73	€55	€53	4342	NCBC
922	GZY	GADDAGH CUDDY REEKS	2013	HO	€192	€65	€107	€5	9247	SEBULLS
869	TIO	TIRONUI OM JOSKIN	2005	JE	€110	€74	-€23	€43	3657	EURBULLS
808	PKA	PUKEROA TGM MANZELLO	2007	JE	€193	€103	€15	€50	2673	NCBC
790	WLY	IMLEACH LUCKY WHISTLER	2011	HO	€170	€84	€25	€21	6988	EURBULLS
738	OKT	OKURA LT INTEGRITY	2010	JE	€201	€138	€33	€44	3959	EURBULLS
712	YMD	MOODYS EXECUTIVE	2010	JE	€157	€91	€23	€32	3503	EURBULLS
Average					€180	€78	€50	€32		

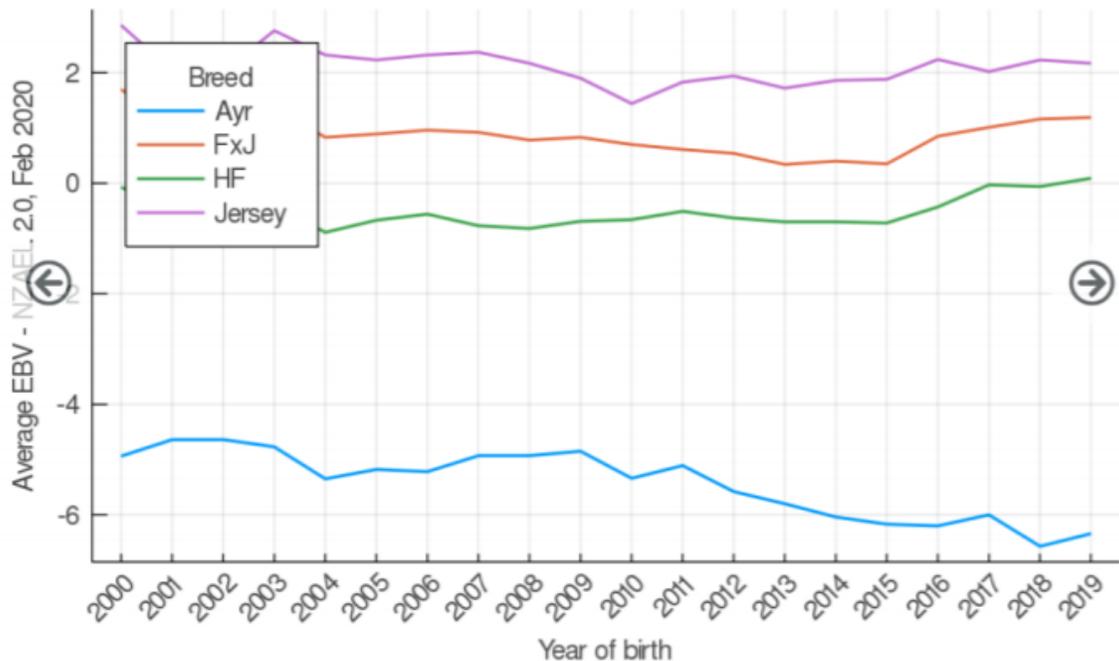
**T2. Top 10 highest EBI bulls used by the Groups.**

Count	Code	Name	YOB	Breed	EBI	Milk	Fert	Maint	Dtrs	Semen Seller
330	KOZ	KEVINSFORT OJI HAZE	2007	HO	€275	€62	€125	€16	9672	NCBC
37	YKA	(IG) ARDKYLE MOUNT EVERET	2013	HO	€267	€87	€120	€14	641	NCBC
93	AZG	DEANS GROVE ARGENT	2011	HO	€258	€74	€118	€21	952	SEBULLS
659	LHZ	(IG) LAURAGH EVERT	2009	HO	€256	€68	€134	€23	19395	NCBC
178	APY	ARRIETA NOMAD	2009	FR	€253	€69	€119	€38	867	EURBULLS
84	FR2233	(IG) TAMARIU HAROLD	2015	HO	€252	€132	€84	€4	1935	NCBC
32	FR2424	POSSEXTOWN FAITHFUL SRM	2015	HO	€248	€89	€104	€13	423	EURBULLS
50	SJU	SKJENAUST	2000	NR	€247	€11	€153	€12	461	NCBC
25	FR4028	(IG) CLOHANE LUCKY STRIKE	2015	HO	€244	€104	€83	€19	88	NCBC
31	ZCK	CASTLELAKE I-CON	2013	HO	€241	€71	€116	€20	153	EURBULLS
Average					€254	€77	€115	€18		

- A lot of bulls used in herds that have NOT improved genetics for female fertility.
- Suggests a focus on other traits, e.g., maintenance sub index and/or heterosis.
- There is no evidence that proves for imported bulls “improve over time”. Some improve, some disimprove, average stays the same.
- Focus on using high EBI teams of bulls evenly on your herd.
- For cross-breeding herds, important to target a team of bulls with a female fertility sub index of €70+.

# NZ Genetic Trends.

Genetic Trend: Fertility Estimated Breeding Value (EBV)



Fertility %/year: Ayr -0.149 / FxJ 0.036 / HF 0.078 / Jersey 0.027

- One of the reasons why cross-breeding herds have NOT seen consistent improvements in female fertility => lack of genetic gain in female fertility traits. If picking JE and/or cross-bred sires, focus on female fertility sub index (for Ireland).

## Jersey | TOP 5 Performers

### JERSEY DAUGHTERS

NZ Bull Code	IREAI Code	Bull Name	EBI	EBI Rel%	Milk Prod SI	Fertility SI
<b>Jersey</b>						
317023	JE6724	SHEPHERDS LT FLINT ET S3J	218	59	141	44
316039	JE6238	ULMARRA TT GALLIVANT *	244	57	136	55
314052	JE4516	CRESCENT EXCELL MISTY ET	205	65	106	45
315045	JE4989	GLENUI DEGREE HOSS ET *	244	66	105	91
317060	JE6727	PASPALUM OI LIMELIGHT *	164	55	118	18
317034	JE6721	HEUVEN SUPER WISEGUY *	243	54	122	68
314012	JE4259	KAITAKA OI LEOPARD ET	216	72	114	46
314004	JE5992	BELLS OI FLOYD S3J *	233	66	127	54
315009	JE5061	RIVERVIEW AND DEXTER S2J *	215	65	122	48
315049	JE5100	KAIMATARAU TERRIFIC PUNCH	185	64	93	51
312057	JE2438	BELLS CM CONRAD S2J	169	87	67	39

\*Available in sexed\*. For Single AI use only. See bottom of

# Comparison of milk & fertility performance.

T1. Average performance of Holstein Friesian animals, in discussion group herds.

Year	Count	EBI	Milk	Fert	Milk kg	Fkg	Pkg	F%	P%	Age1	CI Days	Alive
2009	1440	€68	€19	€27	4,088	172.3	142.1	4.21%	3.48%	733.5	388.7	4%
2010	1559	€70	€22	€27	4,458	185.4	155.3	4.16%	3.48%	750.5	385.8	6%
2011	1607	€88	€26	€36	4,479	189.9	157.4	4.24%	3.51%	751.2	379.6	9%
2012	1398	€96	€27	€41	4,538	191.9	160.2	4.23%	3.53%	739.3	379.8	16%
2013	1280	€111	€32	€48	4,574	193.4	161.0	4.23%	3.52%	735.9	377.3	19%
2014	1445	€122	€34	€55	4,456	191.1	158.6	4.29%	3.56%	738.4	375.8	28%
2015	1568	€135	€40	€59	4,835	209.9	175.9	4.34%	3.64%	742.3	375.6	42%
2016	1263	€147	€47	€64	4,670	204.8	167.2	4.39%	3.58%	740.8	375.2	59%
2017	1477	€153	€52	€64	4,878	213.8	177.4	4.38%	3.64%	747.8	372.9	72%
2018	1384	€164	€54	€70	4,915	217.6	179.9	4.43%	3.66%	747.1	371.3	83%
2019	1577	€173	€56	€75	4,618	207.3	170.9	4.49%	3.70%	743.1	366.0	93%
2020	1295	€180	€55	€80	4,765	212.1	175.6	4.45%	3.68%	736.3		

T2. Average performance of Jersey X-bred animals, in discussion group herds.

Year	Count	EBI	Milk	Fert	Milk kg	Fkg	Pkg	F%	P%	Age1	CI Days	Alive
2010	109	€111	€33	€39	3,950	185.2	145.9	4.69%	3.69%	740.9	381.2	7%
2011	598	€114	€39	€42	3,999	194.4	148.6	4.86%	3.72%	736.0	377.9	10%
2012	751	€113	€36	€41	3,943	189.5	148.3	4.81%	3.76%	737.7	380.1	20%
2013	1123	€124	€45	€38	4,141	198.5	155.3	4.79%	3.75%	736.2	379.3	27%
2014	1194	€131	€51	€37	4,068	196.5	153.7	4.83%	3.78%	735.9	377.4	28%
2015	932	€143	€53	€45	4,446	214.2	170.7	4.82%	3.84%	747.8	376.7	44%
2016	630	€155	€60	€51	4,280	207.4	160.9	4.85%	3.76%	738.7	376.6	61%
2017	640	€160	€62	€50	4,358	212.8	166.8	4.88%	3.83%	740.2	371.5	73%
2018	674	€164	€66	€55	4,547	220.3	174.0	4.84%	3.83%	741.6	372.7	86%
2019	997	€169	€67	€56	4,443	215.3	171.0	4.85%	3.85%	735.6	368.9	93%
2020	1054	€168	€70	€55	4,487	219.9	174.1	4.90%	3.88%	734.1		

- Analysis of data from sub-group of 131 herds (31,859 records) with HF, JE-Xbred and Mixed breed cows (performance of HF & JE-Xbred cows only shown). Spring calving heifers only included.
  - Milk performance => based on 1<sup>st</sup> lactation yields (actual yields up to 305 days).
  - CI days => based on average CI days (all lactations) for heifers with 1<sup>st</sup> lactation data (as per above).
  - Alive => based on % of these animals that are still alive.
- Some breed difference in milk and cow survival performance in early years. Little difference in latter years. **Focus on EBI, not breeds, in context of National breeding program.**