



IRISH CATTLE BREEDING FEDERATION

Review on crossbred data handling in Interbeef



Review prepared by ICBF genetic team
for InterBeef Technical Group – October 2016

Background

- InterBeef evaluations
 - 2 breeds LIM CHA
 - Pure breed genetic evaluations
- Some countries may have data on commercial animals
 - IRL : 70% weaning weight records are commercial data

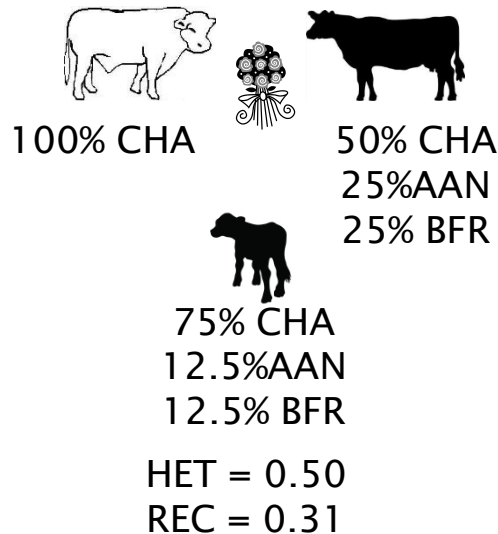
Breed Composition

- Corner stone for evaluation for Xbred records
- Calculated at national level
 - Calf registration (dam ID + sire breed) – est. 1996 in IRL
 - Other national rules
 - Esp. for historical data
- Sires used are generally purebred
- Dams used are generally purebred
 - In pedigree herds
- Dams used are generally crossbred
 - In commercial herds
 - Founder animals can be crossbred

Using Breed Composition

To calculate HET & REC

- Van der Werf and De Boer (1989 – JDS 72 (10): 2606-2614)
 - $HET_{(AB)} = A_{dam} \cdot B_{sire} + A_{sire} \cdot B_{dam}$
 - $REC_{(AB)} = A_{sire} \cdot B_{sire} + A_{dam} \cdot B_{dam}$



To account for breed

- In the model
 - By adding breed covariates
 $WT \sim SEX \ BR1 \ BR2 \ BR3 \dots$
 - No change @ Interbeef
 - Post-process necessary to add breed solution to EBVs
- In the pedigree
 - By creating pedigree groups (Quaas, 1988 JDS 71: 1338-1345)
 - Some modif. @ Interbeef
 - No post-process necessary

Current Xbred Evaluation

- Correcting for breed composition in the model
 - IDEA to authorise uploading breeds other than LIM, CHA, & SIM
 - Uploaded pedigree unchanged
 - 602 & 603 files include 10 breed covariates
 - Interbeef model runs swiftly
 - No change in files distributed by Interbeef
 - Post-process done at country level
 - For all animals with EBV, adding the breed solution (*solreg* file) to the relevant breed composition
- Ex: animal 75%LIM 25%HOL with an EBV = 1.52kg
- $$EBV_{ab} = 1.52 + 0.75.solLIM + 0.25.solHOL$$
- Post-process can be done at Interbeef level
 - Interbeef needs the breed composition of all animals in the pedigree

Alternative: Using Pedigree Groups

- Creation of pedigree groups of breed
 - IDEA to authorise uploading breeds other than LIM, CHA, & SIM
 - Uploaded pedigree unchanged
 - Interbeef to create pedigree groups (ex: country-breed)
 - 602 & 603 files unchanged
 - Interbeef model runs a bit longer but still swiftly
 - No change in files distributed by Interbeef
 - No post-process necessary

The Irish Beef & Dairy Melting Pot

Breed Composition of 2014 Born Calves

	Breed	Breed of Dam															Total
		AA	BA	BB	CH	FR	HE	JE	LM	MO	MY	RB	SA	SH	SI	Other	
Breed of Sire	AA	37,496	321	4,147	9,275	174,730	7,846	3,365	14,579	2,682	399	1,377	681	3,219	5,691	3,290	269,098
	BA	602	2,198	903	1,302	904	444	27	2,413	82	6	16	149	148	779	210	10,183
	BB	3,803	1,138	5,407	4,952	25,570	2,293	424	17,829	1,165	115	219	583	1,023	3,601	964	69,086
	CH	29,611	2,132	13,924	127,226	11,601	23,047	212	95,453	1,313	123	187	6,275	8,977	35,661	2,180	357,922
	FR	1,918	11	639	258	666,410	1,148	21,356	939	5,499	735	2,901	54	1,273	863	7,762	711,766
	HE	4,448	126	1,079	2,804	115,987	17,720	1,767	4,331	2,337	313	909	230	1,633	2,499	1,516	157,699
	JE	55	0	3	7	14,561	14	5,300	14	143	14	158	2	21	6	606	20,904
	LM	29,186	2,596	19,848	54,950	55,412	24,217	727	159,898	2,924	235	619	3,745	6,716	31,418	3,417	395,908
	MO	68	8	19	25	2,287	27	54	69	3,706	19	94	2	41	95	84	6,598
	MY	6	1	3	1	316	13	8	5	34	658	190	3	16	12	14	1,280
	RB	30	0	5	6	2,196	15	119	10	201	46	1,982	1	34	21	163	4,829
	SA	936	99	412	1,344	2,165	551	48	1,852	145	10	107	3,550	310	770	203	12,502
	SH	1,050	33	394	992	3,039	574	158	1,299	110	59	64	75	6,273	577	402	15,099
	SI	3,849	314	1,809	7,332	12,488	3,616	122	10,268	774	117	231	514	1,198	21,018	523	64,173
	Other	1,736	382	1,173	1,746	10,075	904	1,624	4,386	484	88	219	383	455	1,279	9,067	34,001
Total		114,794	9,359	49,765	212,220	1,097,741	82,429	35,311	313,345	21,599	2,937	9,273	16,247	31,337	104,290	30,401	2,131,048

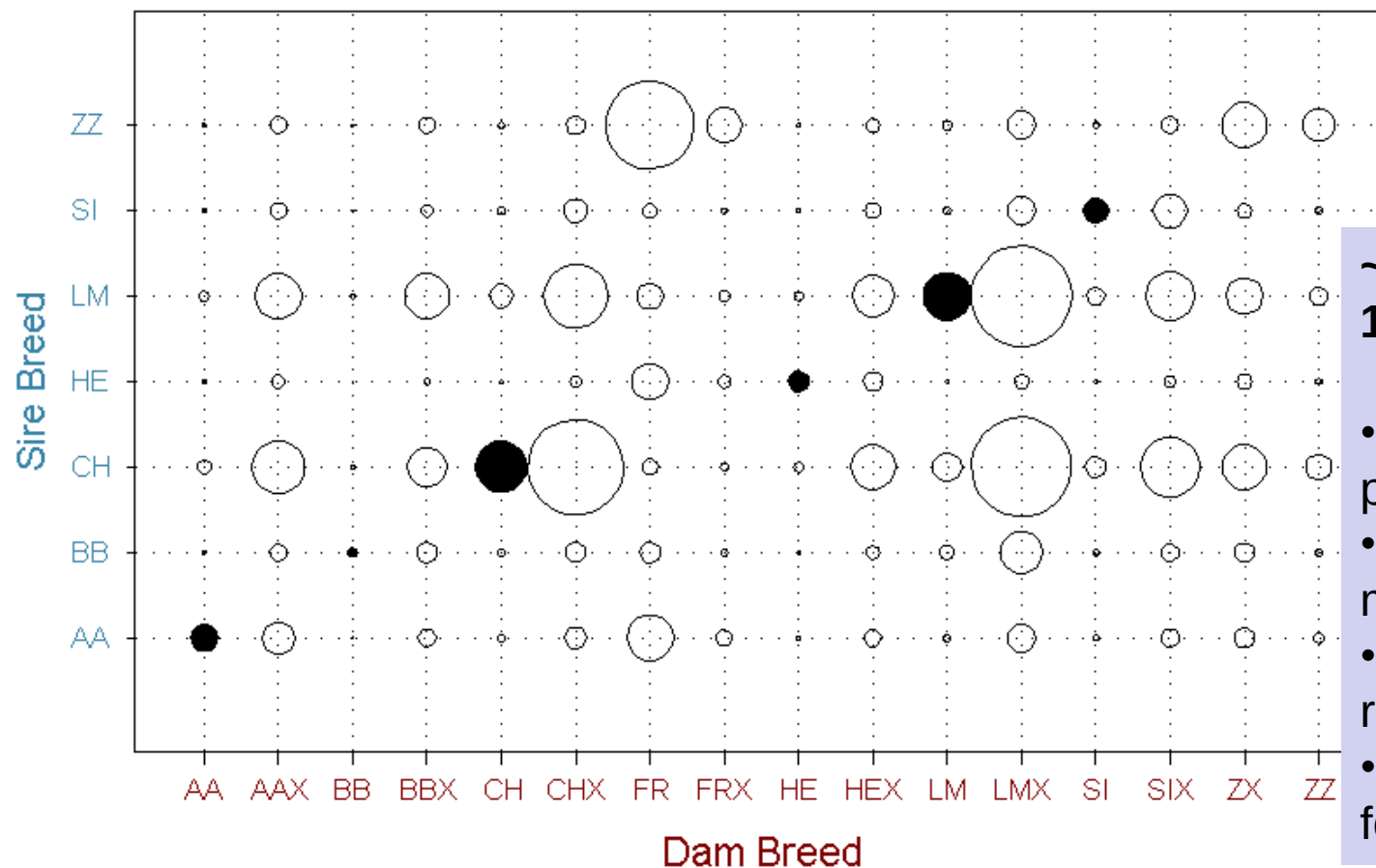
+2,000,000 calves born

- 900,000 calves born from BEEF dams

Source: DAFM – AIM Bovine Statistics Report 2014
Available online <https://www.agriculture.gov.ie>

Collecting Weaning Weights in 2015

2015 Weaning Weights By Breed



**~200,000 weights
150-300d recorded**

- 8.2% from purebred matings
- 74% recorded in marts (live auction)
- 26% (~60,000) recorded on farm
- (min) 15% from foreign sires

'..X' indicate cross breeds - 'ZZ' = other pure breeds - 'ZX' = other cross breeds

Weight recording

Animal performance on an beef farm is gauged by weight gain. Efficient, fast-growing animals that reach a desired weight as early as possible are what is desired, in suckler herds, apart from a possible intensive finishing period, calves will generally express their highest growth rate in the period from birth to weaning. Milk is a major driver of calf growth; therefore, the milkability of the suckler cow is a key determinant in the weaning weight of a calf.

The Euro-Star Index system recognises this through the emphasis on milk in the Replacement Index (RI).

Measuring milkability
Identifying animals and bloodlines with a high genetic merit for milk is of critical importance to the production of replacement females for the suckler herd. Quantifying the milkability of suckler cows is done by weighing their calves. Calves expressing the highest average daily gain (ADG) within a herd are generally out of the milkiest cows in that herd.

If daughters of a particular bull are consistently producing calves with higher ADGs than their grandmothers, then this will improve that bull's Replacement Index and milk figure. The more daughters with record calf weights, the higher the resulting ADG is.

Benefits of weighing
There are two main benefits to weighing stock on farm:

1. The first and most obvious one is management. Knowing the exact weights of stock allow you to project why/whether data, pen animals by weight, dose at the correct rate and adjust feeding rates accordingly. If weighing just before slaughter, you can calculate accurate kill-out percentages. Analysing the weights and ADGs of suckler calves allow you to identify top-performing cows for potential culling. Some suckler farmers are now weighing their

cows, as well as their calves at weaning, to work out the weaning weight to cow live weight percentage. You should target a suckler cow to wean at least 80% of her own weight.

2. The second benefit is the impact of weight recording on the Euro-Star Index. Weight recording your suckler calves annually will increase the reliability figure on your suckler cows' Replacement Index and milk figure. The benefit of more weight recording nationally is more bulls and cows being identified as potential animals to improve milk production.

When to weigh
The most critical time frame in which to weigh suckler calves is between 330 and 350 days of age (five to eight months). Weights recorded on calves in this period best reflect the milkability of the suckler cow and are used in the genetic evaluation process to generate the milk figures for cows and bulls. Weighing animals at the beginning, during and end of a finishing period is also good practice to monitor performance and weight return on feed.



One of Donal's top-performing cows with her current calf. This seven-year-old 500 cow has a Replacement Index of 6172 and has produced six calves with an average culling interval of 359 days. She currently weighs 665kg, her current calf is 4.5 months old and weighs 260kg (1.62 ADG). Her 2014 calf weighed 430kg at weaning (1.56 ADG), which means her cow weaned 68% of her own bodyweight. This calf was recently slaughtered as an 18-month bull with a carcass weight of 260kg. The cow is sired by the AI sire Derragh Samuel (DSH).

Q&A

FARMER FOCUS: DONAL SCULLY

Weighing is a job I look forward to

Name: Donal Scully, Boregon, Co. Limerick
Parent: 100% Pure Friesian Suckler to beef
Stock: 6 Star Friesian Cows; 33, Heifers; 43, 1 Stock Bull or AI; 500 Bull and 500 AI
Replacement strategy: Sired my own and buy in.



Donal Scully

Why did you join the BDP? I like the idea of more information feeding into the indexes of my cows through genomics to improve their reliability. I think it will get me to where I want to be in terms of breeding that is better. It will also get me to take more advice of the Euro-Star Index than I have been in the past.

Do you feel it will deliver for the suckler suckler herds? I think it will, as I've already said, reliability is a big factor for me and if the programme results in more reliable indexes on young breeding stock, then it will be a success.

When and why did you start weighing stock on your farm? I started weighing about 5 or 6 years ago. It coincided with me starting to finish my own animals and it was important for me to know what my animals were giving back for what I was feeding. I bought my own scales for about €1,300 and it was one of the best investments I ever made. When I started weighing I soon realised how important it was as I found that my pre-weighing estimations were well off the mark. I weigh all suckler cows and calves as well every year. I can monitor the ADG's of my calves and also calculate the percentage of each cow's live weight that she is weaning.

Do you feel it is a valuable tool? Not at all. Naturally you have to put animals through the crush, but you have to do this for a lot of other tasks eg. feeding, dosing, vaccinating etc. I actually find it additive as you're constantly curious to know

how each animal has performed since they were last weighed. I record all weights once through my HerdPlus log and it's a really useful tool for analysing performance. The ADG is such a simple figure, but it tells you so much. Because of this, weighing is actually a job I look forward to doing. What are the main benefits that you see from weighing stock? For my finishing animals I know exactly how they are performing throughout the finishing period. If I see an animal's ADG drop, then I know that I need to investigate. It also allows me to set target slaughter dates. I buy in some stock to finish as well and it's interesting to compare the performance of these animals to the home bred ones. For the sucklers, monitoring cow and calf performance is vital. I cull heifers at 24 months and ensuring they are heavy enough for breeding at 35 months is important. I also have accurate live weights when dosing animals. So as you can see, the weighing scales is one of the most important tools on my farm.

NEXT WEEK FERTILITY

PAYMENTS

The first round of payments is expected to commence in December 2015. To facilitate payments, BDF will require herders to:

1. Return all genotype samples requested (tags and any replacement hair cards).
2. Complete all survey data for animals born up to 30 June 2015 before Tuesday 1 December. Surveys can be completed online through www.icbf.com, www.agood.ie or through a farm software package. Alternatively you can complete and return the survey forms which you received by post.

Getting Farmers to Weigh Cattle

Benefits of weighing

There are two main benefits to weighing stock on farm:

1. The first and most obvious one is management.
2. The second benefit is the impact of weight recording on the Euro-Star index.

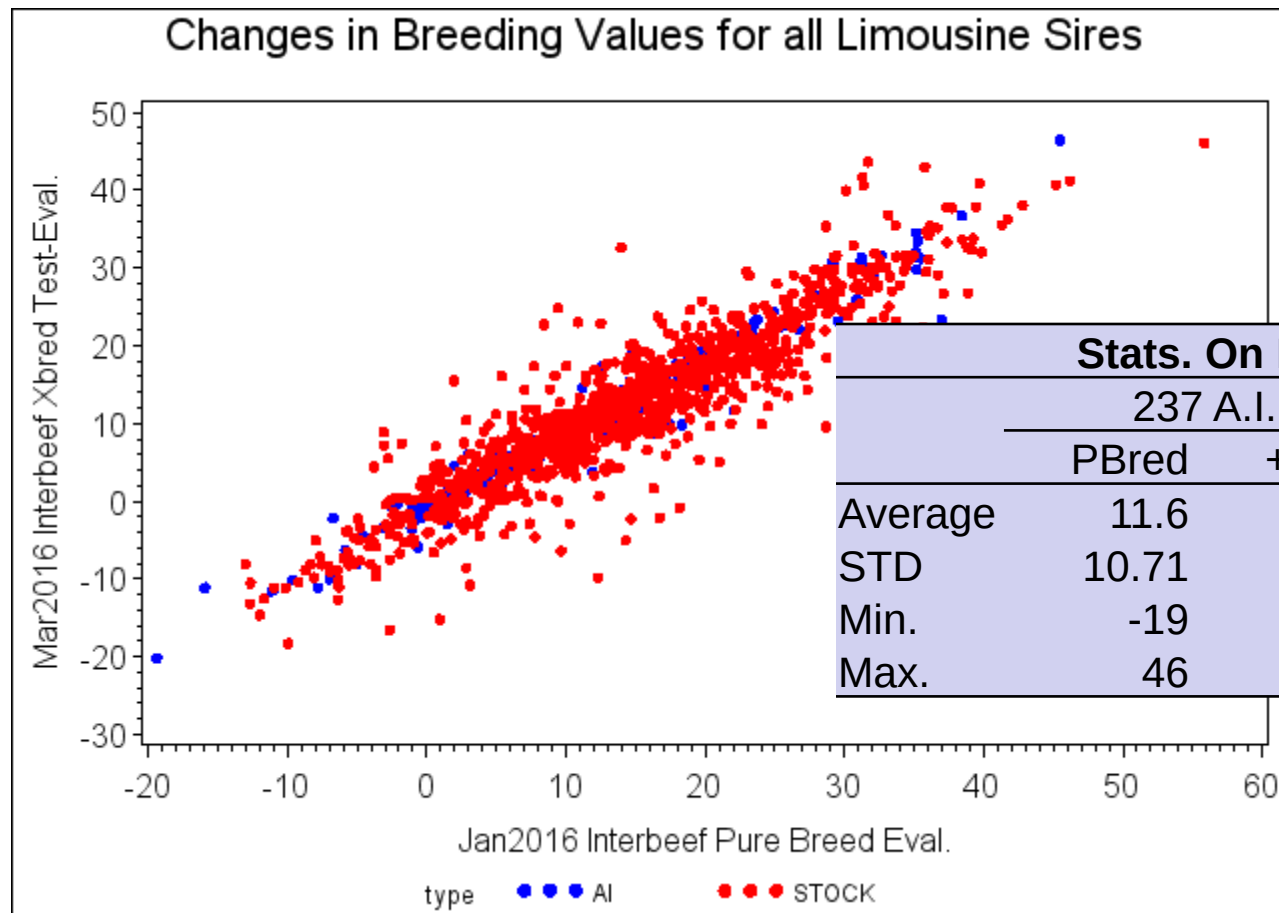
Benefits of Having Xbred in Interbeef

- More bulls evaluated

	Jan2016 PureBred Evaluation		Mar2016 XBred Evaluation	
	A.I. Bulls	Stock Bulls	A.I. Bulls	Stock Bulls
N Bulls	342	1278	399	10237
Aver. N Progeny	25	6	94	12
STD N Progeny	43	7	224	14
Min. N Progeny	1	1	1	1
Max. N Progeny	322	80	1928	251

Benefits of Having Xbred in Interbeef

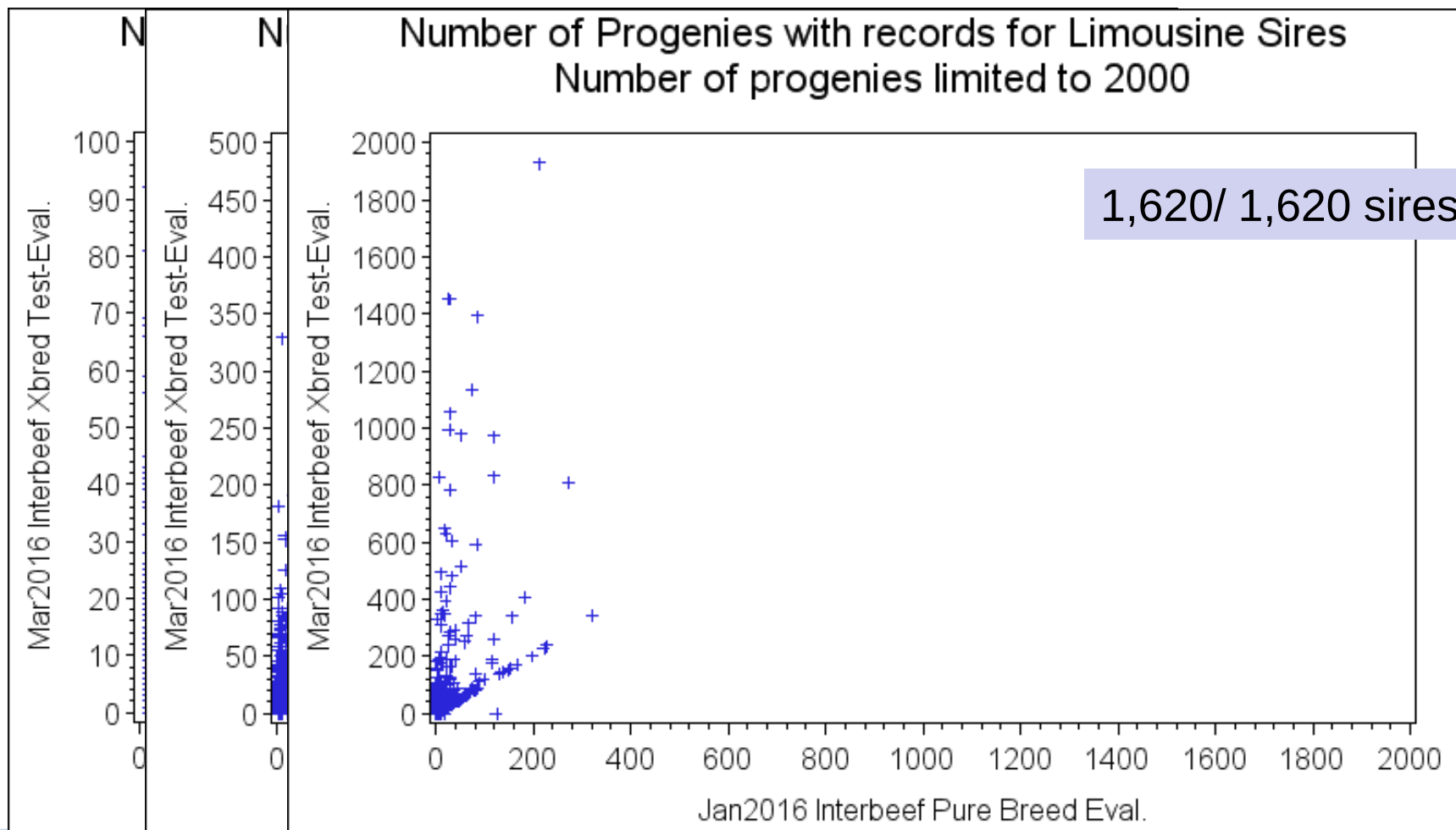
- Change in breeding values



	Stats. On Breeding Values			
	237 A.I.		988 Stock	
	PBred	+Xbred	Bred	+Xbred
Average	11.6	10.4	14.6	12.3
STD	10.71	10.12	10.67	10.55
Min.	-19	-20	-13	-18
Max.	46	47	56	46

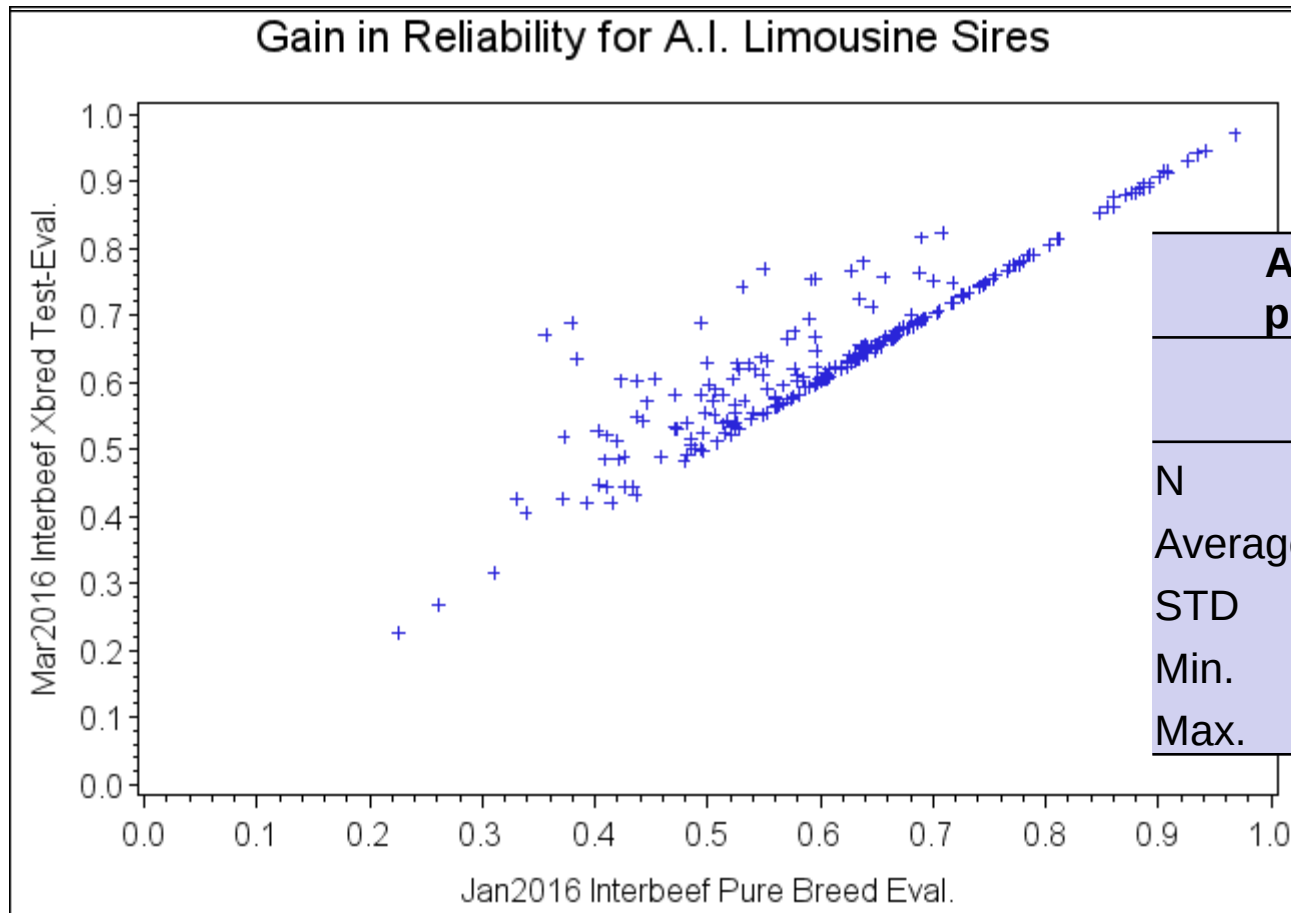
Benefits of Having Xbred in Interbeef

- Gain in weight records



Benefits of Having Xbred in Interbeef

- Gain in reliability



Average reliability for publishable A.I. bulls		
	Jan2016 Pbred	Mar2016 Xbred
N	238	282
Average	0.615	0.630
STD	0.138	0.122
Min.	0.226	0.226
Max.	0.968	0.971

Conclusion

- Breed composition and Xbred records are the main ingredients for the Xbred recipe
- Including Xbred records in Interbeef evaluation needs
 - Either changes in the model (breed covariates) + post-process
 - Or changes in the evaluation pedigree (groups)
- Including Xbred records has major benefits at national level
 - More animals evaluated
 - Gain in reliability