



IRISH CATTLE BREEDING FEDERATION

ICBF Beef Industry Meeting.



Agenda.

- Beef Data and Genomics Program (BDGP); Update - Andrew Cromie
- Maternal & Terminal Index; New EV's, switch to live-weight re: cow maintenance and new maternal index construct – Andrew Cromie.
- Maternal weaning weight proofs; Use of weaning weight and cow milk score data – Ross Evans.
- Use of foreign EBV's in Euro-Star evaluations - Ross Evans/Thierry Pabiou.
- Beef genomics research; Update - Ross Evans.
- Calving performance proofs; Non-linearity in proofs and EV's - Noirin McHugh.
- Dairy Beef Index; Update. Noirin McHugh.
- ICBF & Teagasc Weight Recording Initiative; Update - Chris Daly/Aidan Murray.
- AOB

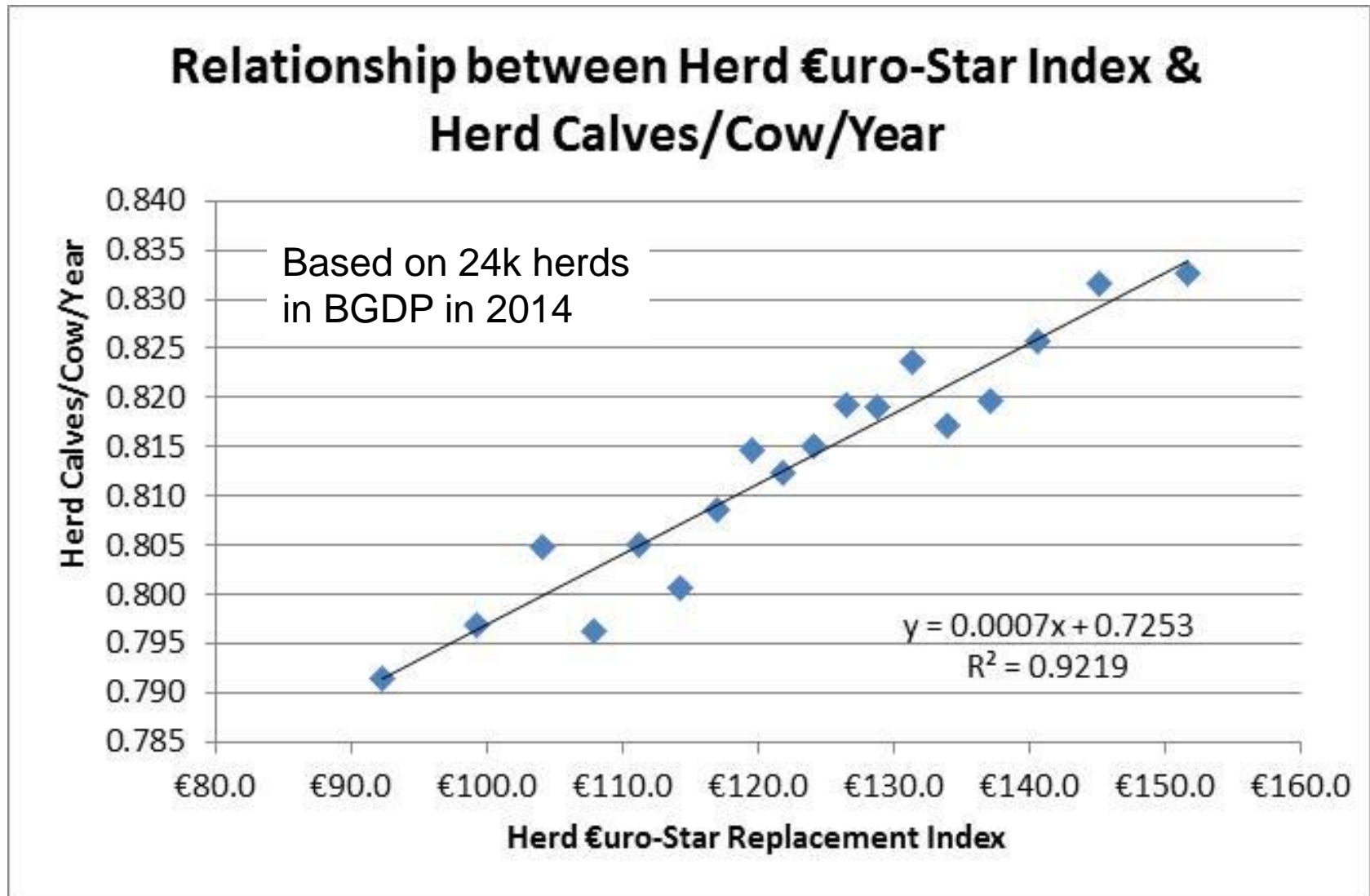


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Beef Genomics and Data Programme (BDGP)



Increasing Herd Euro-Stars => more calves/cow/year and less GHG/LU



Ireland's BDGP Scheme.

- If suckler cows are viewed as “the problem”, surely they can also be part of the solution!
 - Breed more profitable & sustainable cows.
- Funded as part of EU Rural Development Program. Co-funded with our own DAFM.
- €300m total funding over 6 years.
 - Works out at approximately €90/cow.
 - 1 million animals genotyped in next 2 years.
- ~29.1k herds & ~641,000 cows “signed up”.

Key Actions re: Scheme.

- Calving. Complete additional calving details at birth, e.g., sire & calving survey.
- Surveys. Collect additional survey data on individual animals (calves, cows, stock bulls).
- Genotyping. Genotype 60% of “reference cows” (number cows calved in 2014) on annual basis.
 - Pedigree animals given priority.

Key Actions re: Scheme.

- Replacement Strategy. Replace herd with 4 & 5 star females & males.
 - 79% of 20k stock bulls on 2015 herds are compliant.
 - 37% of herds currently compliant with 2020 requirement & 61% with 2018 requirement.
- Carbon Navigator. Complete a carbon navigator within first 12 months. Update each year.
- Training. Attend training course in first year.

Initial feedback.

- A lot of concerns raised re: aspects of scheme.
 - 6 year term, 2014 reference year, accuracy of indexes, level of genotyping.....
- Should not have been surprised; limited knowledge re: Euro-Stars at herd/cow level.
- Despite concerns, scheme is “filled”. ICBF confident of delivering a high quality scheme for farmers & industry.



Analysis of Herds & Females.

T1. Cows & 16 month heifers.		
Category	Numbers	%
Calvings (based on 2014 ref year)	584,033	
Total Cows	641,153	
- 4 & 5 star cows	283,909	49%
- 4 & 5 star cows and born after 2008 (as per 2020 reqt)	162,096	28%
- 4 & 5 star cows and born after 2010 (as per 2018 reqt)	99,542	16%
16 month heifers (born before 30 June 2014)	328,803	
- 4 & 5 star 16 month heifers	105,415	32%

- 29,123 herds in scheme. 283k 4 & 5 star cows on farms & 105k potential female replacements (>16 months).

Stock Bulls.

- Of the 29,123 herds, 19,293 have a stock bull (66.2%).
- Of these 19,293 herds, 15,140 have an “eligible” stock bull (79%).

Availability of “eligible” bulls from BDGP ped herds.

- BDGP herds will require a steady supply of 4 & 5 star bulls.
 - BDP 2014 suggest we need ~5k/year.
- 3,908 herds with ≥ 1 pedigree registered bull born in 2014.
 - 3,908 herds \Rightarrow 14,472 ped reg males.
- Of 3,908 herds, 2,799 are in BDGP (72%).
 - 2,799 herds \Rightarrow 11,459 ped reg males (79%) \Rightarrow 8,457 eligible 4 & 5 star males (74%). Well in excess of ~5k requirement.

Analysis of herds with pedigree registered bulls in 2014, by herd size

Ped M 2014	Herds	BDGP Herds	%	Ped M	BDGP Ped M	%	Elig BDGP M	%
>=10	295	250	85%	4826	4178	87%	3224	77%
7, 8 & 9	278	227	82%	2153	1764	82%	1338	76%
5 & 6	329	278	84%	1776	1500	84%	1062	71%
4	320	239	75%	1280	956	75%	706	74%
3	474	346	73%	1422	1038	73%	734	71%
2	803	564	70%	1606	1128	70%	766	68%
1	1409	895	64%	1409	895	64%	627	70%
Total	3908	2799	72%	14472	11459	79%	8457	74%

- Larger herds (>=10 pedigree male births in 2014), have higher % BDGP participation and more eligible males => very positive outcome.

BDGP Project Plan.

Project areas	Significant progress this week	Significant actions for forthcoming week.
1. Automation	Sire discovery work underway	
2. Ordering/tracking	Feedback re new screens	
3. Billing	Feedback re new screens	
4. BDGP herds.	List herds received.	Continue analysis re: BDGP herds.
5. Recording		Start work re: BDGP recording reqts.
6. Reports	BDGP "starter" report.	Complete & test report.
7. Mart display boards	Continue testing marts	Confirm approach with DAFM.
8. V3 development	V3 build.	Complete v3 submission.
10. Animal genotypes	DNA from HB/AI.	Correcting pedigree/genotype errors.
9. Research/proofs		Start new GE run.
11. Animal Selection	Develop animal selection plan.	Test animal selection plan.
12. Education/training		Develop education material for BDGP reports
13. Tenders	Complete lab tender	Submit lab tender.

What next?

- BDGP Euro-Star reports issued to scheme participants (August).
 - Based on new proof run (new maternal index construct, new EV's, more data, foreign proofs.....).
 - Eligible animals defined on basis of; (i) genotyped and (ii) 4/5 stars (genetic/genomic proof).
- Tags issued to herd-owners (September).
 - Pedigree animals prioritised.
- Beef genomic evaluations from Dec 2015+
 - Test runs in advance of release.



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Maternal & Terminal Index.



Background.

- Outcomes from Euro-Star review group presented at last industry meeting. Recommendations were to:
 - Update economic values.
 - Change construction of maternal index (reflecting increased emphasis on female traits).
- Positive response re: proposed changes. Updated AI bull lists sent out.

Star Rating (within Limousin breed)	Economic Indexes	€uro value per progeny	Index reliability	Star Rating (across all beef breeds)
★★★★★	Replacement Maternal Cow Traits Maternal Progeny Traits	€238 €-30 €268	69% (High) 55% 81%	★★★★★
★★★★★	Terminal	€164	80% (V High)	★★★★★
☆☆☆☆☆	Dairy Beef	€	% (N/A)	☆☆☆☆☆

Star Rating (within Limousin breed)	Key profit traits	Index value	Trait reliability	Star Rating (across all beef breeds)
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Expected progeny performance

	Calving difficulty (% 3 & 4)  Breed ave: 4.95%, All breeds ave: 4.98%	4.30%	94% (V High)	
★★★★★	Docility (1-5 scale) Breed ave: -0.06, All breeds ave: 0.00	0.06 scale	92% (V High)	★★★★☆
★★★★★	Carcass weight (kg) Breed ave: 23.82kg, All breeds ave: 22.98kg	34kg	86% (V High)	★★★★☆
★★★★★	Carcass conformation (1-15 scale) Breed ave: 2.14, All breeds ave: 1.86	2.83 scale	82% (V High)	★★★★★

Expected daughter breeding performance

	Daughter calving difficulty (% 3 & 4) Breed ave: 5.45%, All breeds ave: 6.15%	3.4%	40% (Average)	
★☆☆☆☆	Daughter milk (kg) Breed ave: -0.84kg, All breeds ave: 0.31kg	-3.09kg	55% (Average)	★☆☆☆☆
★★★★☆	Daughter calving interval (days) Breed ave: 1.09 days, All breeds ave: -0.32 days	-.83days	54% (Average)	★★★★☆

Explaining the current Replacement index



Point 0: When you decide on one bull or the other
Profit per calf born

Key traits

50% males ♂

50% females ♀

calving
gestation
mortality
docility
Feed intake
carcass



+



Key traits:
Early maturity,
calving ease,
milk, fertility,
survival,
maintenance
cost

Key traits:



♂



calving
gestation
mortality
docility
Feed intake
carcass

♀



Key traits:
Early maturity, calving
ease, milk, fertility,
survival, maintenance
cost

Explaining the new Replacement index

Point 0: When the female
is being selected for
breeding (sale at mart)

50% females



Key traits:

Early maturity,
calving ease,
milk, fertility,
survival,
maintenance
cost



Key traits:

Early maturity, calving
ease, milk, fertility,
survival, maintenance
cost

Key traits:

calving
gestation
mortality
docility
Feed intake
carcass



Changes in Replacement Index.

	Replacement index relative emphasis		
	Trait	% emphasis	
		Current	New
Traits of the cow	Age 1st Calving	5%	6%
	Maternal calving difficulty	4%	6%
	Maternal weaning weight	12%	18%
	Calving interval	7%	9%
	Survival	5%	8%
	Heifer feed intake	8%	8%
	Cow feed intake	7%	6%
	Cow docility	3%	4%
	Cull cow weight	6%	7%
Traits of the calf	Calving difficulty	11%	7%
	Gestation	2%	2%
	Mortality	2%	1%
	docility	1%	1%
	Feed intake	8%	4%
	Carcass weight	12%	10%
	Carcass conformation	4%	3%
	Carcass fat	2%	1%
Total		100%	100%
Traits of the Cow emphasis		57%	71%
Traits of the Calf emphasis		43%	29%

Changes in Terminal Index.

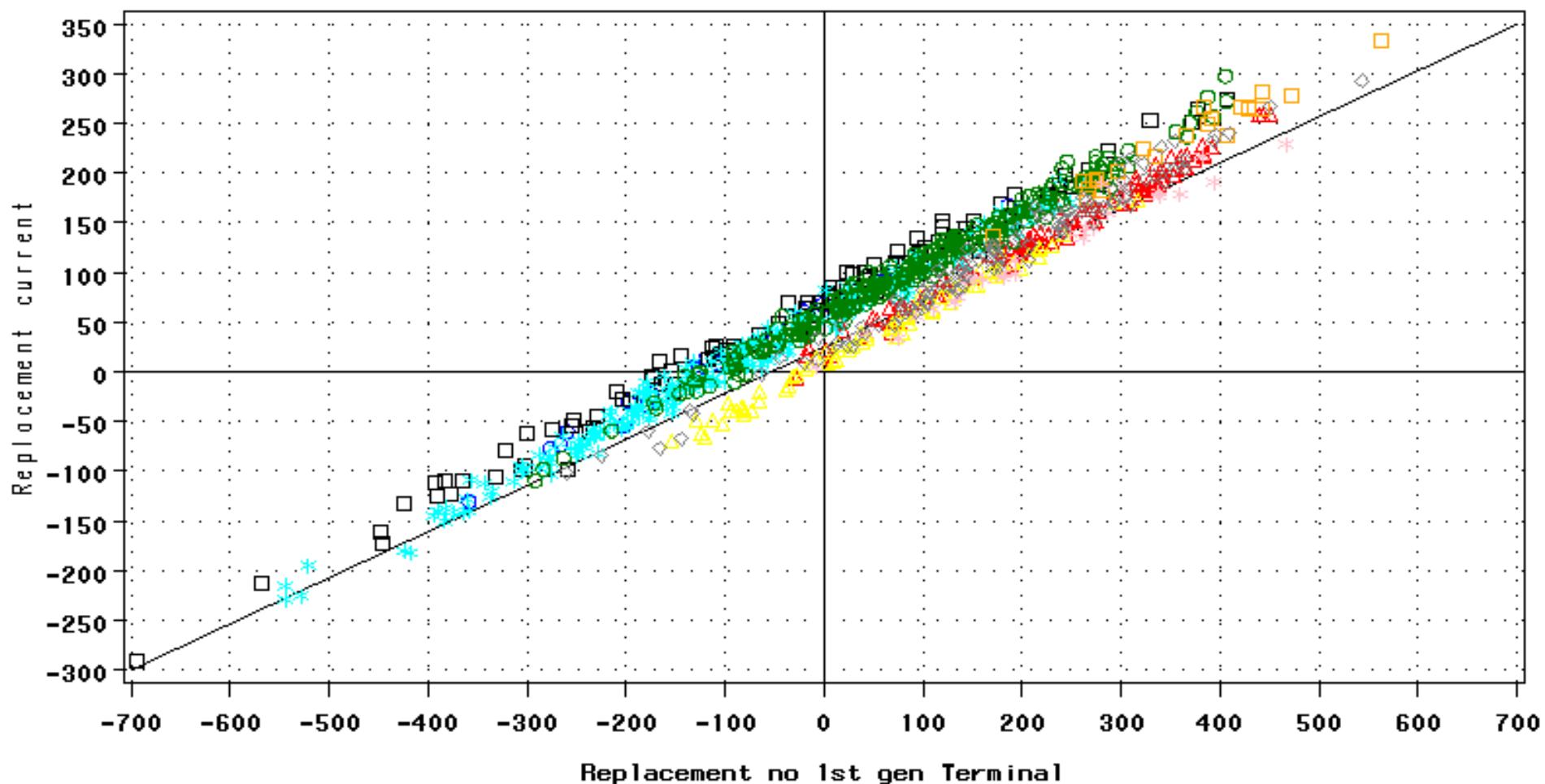
Terminal Index		
Trait	% emphasis	
	Current	New
Calving difficulty	21%	18%
Gestation	4%	4%
Mortality	4%	3%
docility	2%	2%
Feed intake	19%	16%
Carcass weight	36%	40%
Carcass conformation	10%	11%
Carcass fat	6%	5%
Total	100%	100%

AI sires 70% rel: Repl v Repl no 1st gen TERMINAL

No of bulls 960 correlation $r = 0.976$

Repl current mean = 77 {stdev = 93}

Repl No Term mean = 62 {stdev = 191.5}



Breed	AA	BA	BB	CH	HE
Symbol	△ △ △	○ ○ ○	□ □ □	* * *	△ △ △
Breed	LM	SA	SH	SI	
Symbol	○ ○ ○	□ □ □	* * *	◇ ◇ ◇	

5 Star bulls across all breeds.

Brd	1 Star	2 Star	3 Star	4 Star	5 Star	Total
AA	21	27	35	50	102	235
AU	8	5	5	11	11	40
BA	52	13	10	13	5	93
BB	166	41	22	15	15	259
CH	363	71	33	26	15	508
HE	74	44	26	20	15	179
LM	96	79	88	70	108	441
PI	5	2	3	6	24	40
PT	11	5	4	9	10	39
SA		1	2	2	55	60
SH	8	6	12	15	41	82
SI	41	23	34	39	76	213
Total	845	317	274	276	477	2189

What next?

- Positive feedback re: new proof changes.
 - Initial consultation.
 - Feedback re: sire listings.
- New definition of star cut-off's for commercial animals.
 - Single set of stars, across all breeds.
- Recommendations to be forwarded to ICBF board meeting on 10 July.
- New changes to be made in next proof run (end July) ahead of BDGP reports in August.

Cow milk score and maternal weaning wt

New data

	Dec 14	Jul15
Weaning wts		
Sire Known	638,507	696,070
Sire and Mgs known	239,123	269,681
Milk scores	379,189	1,234,600

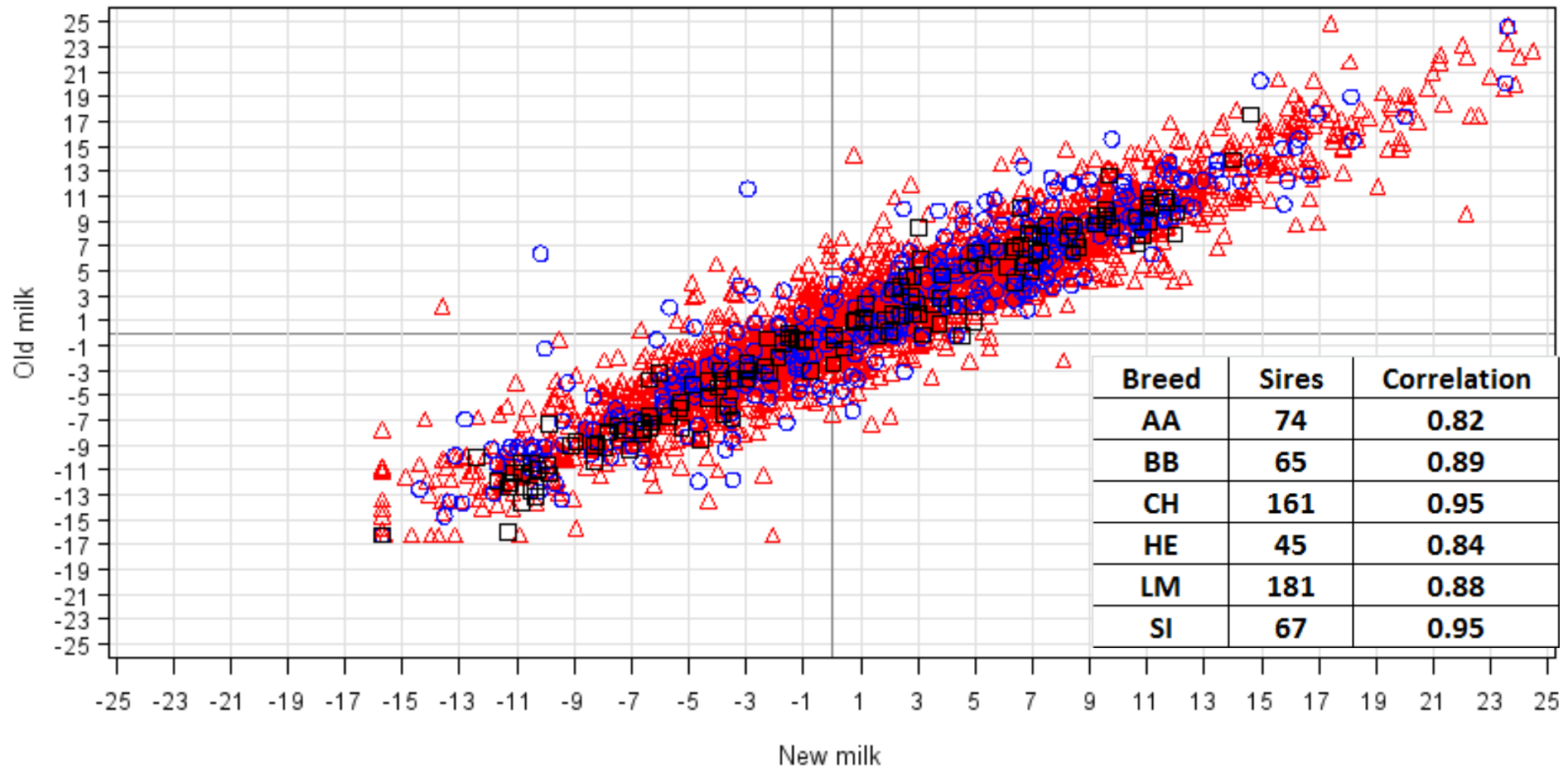
Genetic correlation of 0.6 used between maternal weaning weight and milk score

AI sires compare milk by previous rel category

No of bulls 2822 correlation $r = 0.944$

Oldeval mean = 1.79 {stdev = 7.28}

Neweval mean = 1.82 {stdev = 7.35}



△ △ △ 70-80% relold ○ ○ ○ 80-90% relold □ □ □ 90%+ relold

Correlation between maternal wwt pta and milk score pta for AI sires >90% rel on both

Breed	sires	correlation
AA	32	0.52
BB	34	0.40
CH	67	0.67
HE	12	0.82
LM	96	0.65
SI	40	0.67

Average of 6 main breeds is 0.62

Relationship with foreign ebvs

Breed	Sires	Foreign bv	Correlation current	Correlation new
FRA LM	146	99	0.89	0.89
FRA CH	210	96	0.94	0.94
UK LM	20	104	0.75	0.79
UK AA	73	105	0.75	0.80

Extra information on the web

Date of Evaluation	Percentile Rank within breed	Star rating within Breed	PTA	Reliability	Percentile Rank across Breed	Star rating across all Breeds						
Apr-15	1	★	-11.04	41	2	★						
Dec-14	1	★	-11.04	41	2	★						
Sire Grand Progeny and Grand Progeny Herdmate Information							★					
Mat Wean Wgt					Cow Milk scores							
Date of Evaluation	No. of Progeny	No. of Herdmates	Maternal ADG		No. of scores	No. of Herdmates scores	Average score		% Poor scores (P or VP)		% Good scores (G or VG)	
			Grand progeny	Herdmates			Daughters	Herdmates	Daughter	Herdmate	Daughter	Herdmate
Apr-15	1	5	1.15	1.15	2	5	3.1	3.1	10%	10%	10%	10%
Dec-14	1	5	1.15	1.15	2	5	3.1	3.1	10%	10%	10%	10%
Information on Grand Progeny of bull (From the daughters)												
Date of Evaluation	Avg PTA Mat Wean Wgt	Breed % in grandprogeny by breed										
		AA	BA	BB	CH	FR	HE	HO	LM	SI		
Apr-15		0%	0%	0%	0%	0%	100%	0%	0%	0%		
Dec-14		0%	0%	0%	0%	0%	100%	0%	0%	0%		

Summary

- Moderate increase in weight data.
- Large increase in useful predictor trait milk score data.
- Will help to rank cows in herds with no weight data and initial prediction on sires.
- Maternal weaning weight still a problem trait with regard level of recording i.e. 30,000 weaning weights versus 700,000 carcass records.
 - Project under way with Teagasc to help promote maternal weight recording.
- Results will flow into next evaluation run



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Foreign data inclusion in evaluations



Background

- Foreign EBV => phenotypes for foreign bulls
- Foreign reliability => number of progeny
- 2006-2009: conversion equations between FRA and IRL; 3 breeds.
- 2010-now: Using foreign EBVs in genetic evaluation (FRA, GBR) and IRL; 10 breeds

EBV from France

Breed	Count	%	Last update	Source
Charolais	22299	43%	Mar.2015	Inst. de l'Elevage
Limousine	12047	23%	Mar.2015	Inst. de l'Elevage
Salers	6583	13%	Mar.2015	Inst. de l'Elevage
Aubrac	5113	10%	Mar.2015	Inst. de l'Elevage
Pathenaise	2913	6%	Mar.2015	Inst. de l'Elevage
Blonde d'Aquitaine	2390	5%	Mar.2015	Inst. de l'Elevage
Rouge des Pres	159	0%	Mar.2015	Inst. de l'Elevage

EBV	Growth	Carcass	1 official genetic evaluation / year for birth to weaning traits – within breed – release dates from Feb. to Mar.
Calving IFNAIS AVel	CRsev DMsev DSsev ALait	CONFjbf ICRCjbf	



EBV from United-Kingdom

Breed	Count	%	Last update	Source
Angus	4004	53%	Jun.2015	Pedigree Cattle Breeding Services
Limousine	2164	29%	Feb.2015	SRUC
Simmental	587	8%	Nov.2011	UK Simmental HB
Belgian Blue	534	7%	Nov.2011	Pedigree Cattle Breeding Services
Charolais	175	2%	Nov.2011	Pedigree Cattle Breeding Services
Hereford	128	2%	Nov.2011	HE Simmental HB

EBV

Calving	Growth	Carcass
All breeds	All breeds	AAN

Limousine SRUC : 3 eval./year - release dates Feb./Jul./Oct.

Other breeds : Summer/Autumn

Summary

- France: Routine process
- UK Limousine: Routine process
- UK Angus: Routine process started June 2015 with Pedigree Cattle Breeding Services
- UK Charolais & Belgian Blue: Process started with Pedigree Cattle Breeding Services / no updated file yet / current discussion HB committee level
- UK Simmental & Hereford: Process started with relevant Irish and UK HB.
- Infra-structure now in place between ICBF & Breedplan. Need agreement of relevant herdbooks. Principle can be established to other countries (AUS).

Beef Genomics research

AI Bull genotyping status by breed

breed	active	active and genotyped	% active & genotyped	active and sample submitted	historic	historic and genotyped	% historic & genotyped	historic and sample submitted
AA	37	23	62%	4	453	120	26%	8
AU	5	3	60%		62	2	3%	1
BA	10	7	70%		130	13	10%	4
BB	87	57	66%	11	427	112	26%	24
CH	86	60	70%	6	617	233	38%	10
HE	20	15	75%	1	548	91	17%	13
LM	65	45	69%	7	506	215	42%	16
PI	1				110	1	1%	
PT	8	5	63%	1	55	6	11%	3
SA	7	4	57%		72	15	21%	
SH	23	9	39%	1	206	7	3%	1
SI	30	25	83%	1	391	128	33%	23

Parentage verification/correction

- 110,000 animals genotyped as part of 2013 BGS scheme
- First phase of correction July 15
 - 3,174 commercial animals incorrect sire
 - 160 of these received new predicted sires
 - 480 pedigree animals incorrect sire
 - 120 of these received new predicted sires

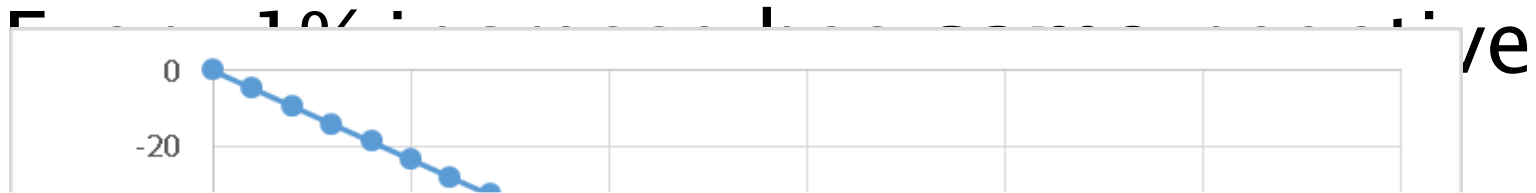
Genomically enhanced breeding values

- Research work at an advanced stage
- Based on a single step evaluation incorporating traditional evaluations and genotypes
- Extra genotyping being done at higher density to improve imputation for smaller breeds
- Test proofs in late September.

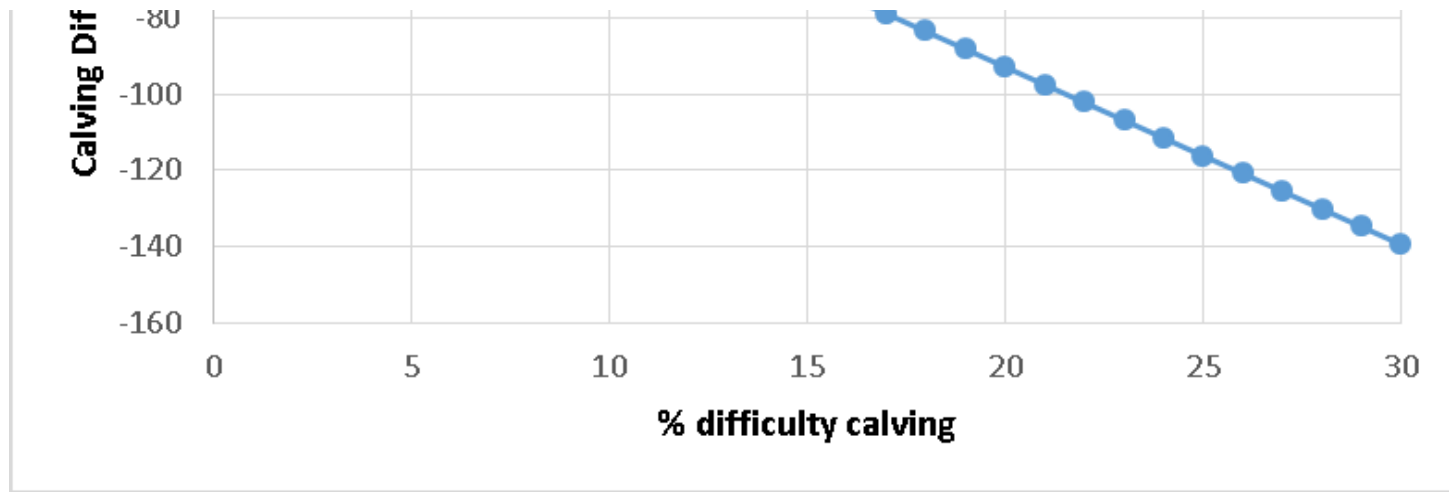
Calving performance update

Non-linear calving utility

- Current calving evaluations assumes linear impact of calving difficulty



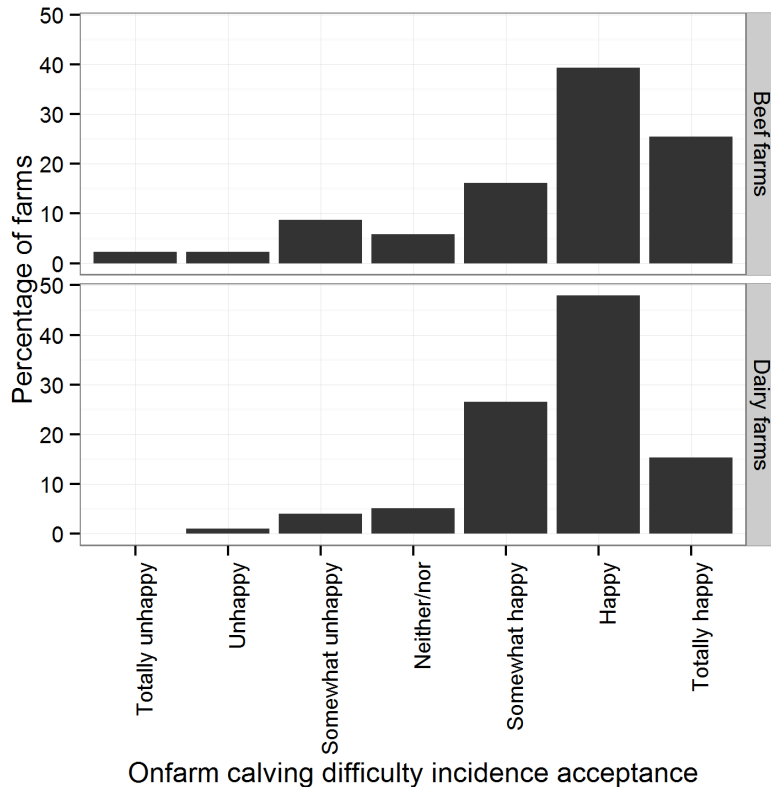
Does this reflect reality??



Calving Survey

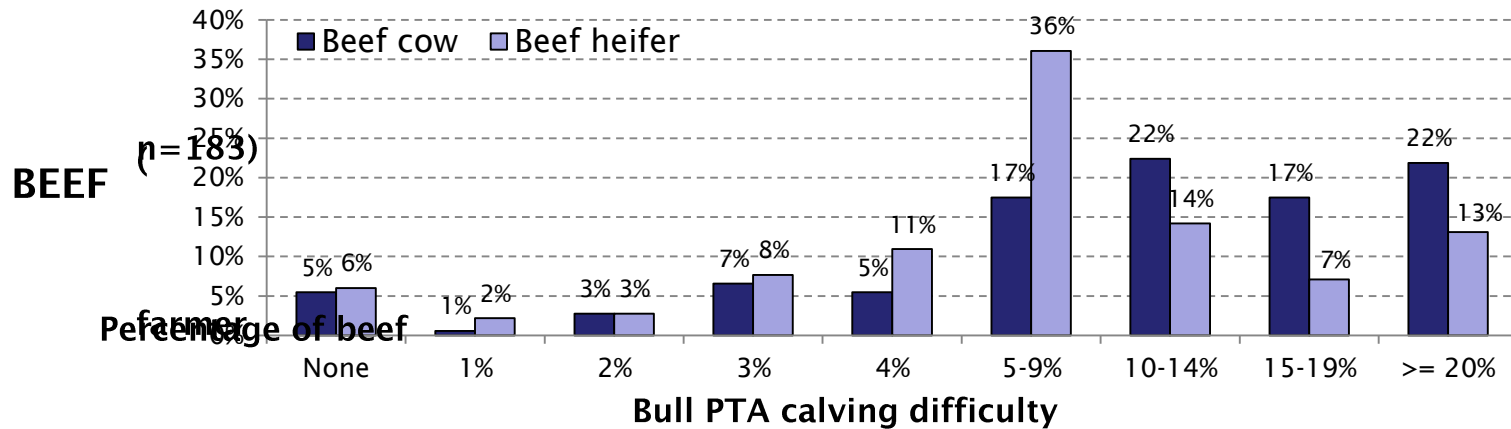
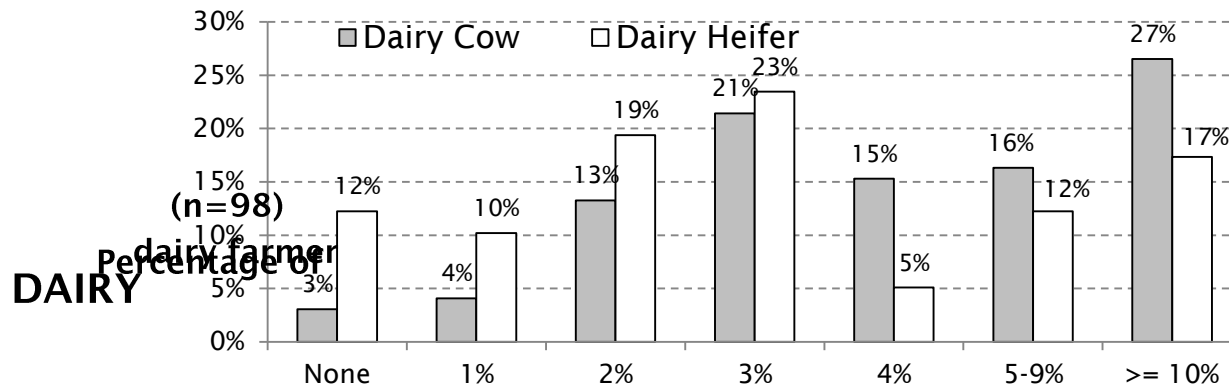
- 281 farmers completed the survey
 - 183 Beef and 98 Dairy
- 75% of dairy farmers prepared to use beef sires
- AI usage in 98% of dairy and 69% of beef farms
- **Questions asked:**
 - Criteria for selecting bulls
 - Appearance, PTAs/Index, reliability, breed....
 - On farm impact of calving difficulty
 - Max CD%, calf value to justify given level of CD
 - Farmers views on calving difficulty
 - Additional labour, economic loss

Current acceptance of calving difficulty levels

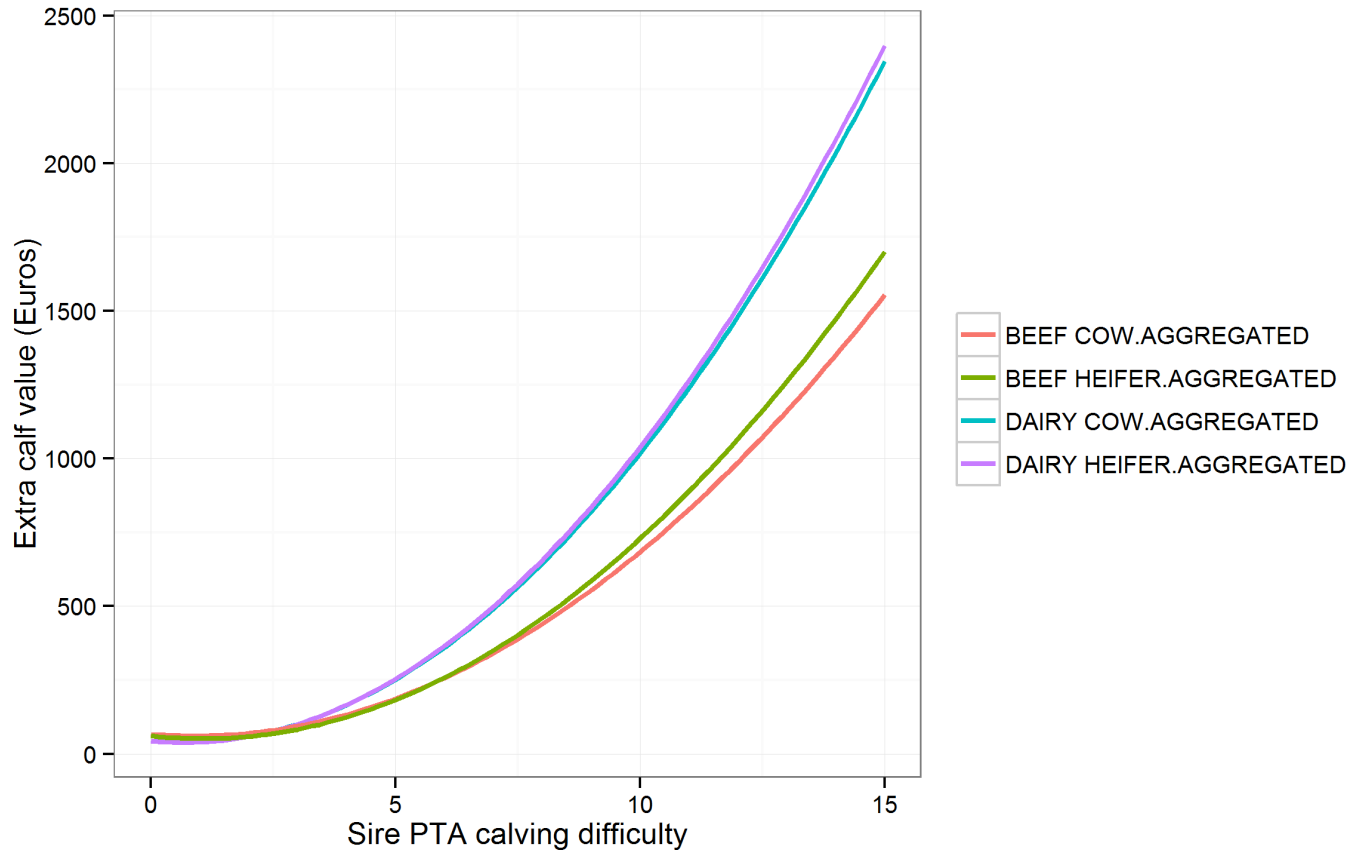


- Beef farmers were less happy with their current calving difficulty incidence compared to dairy farmers
- Dairy farmers using beef sires on dairy cows were less happy about their current level of calving difficulty when compared to those not using beef sires

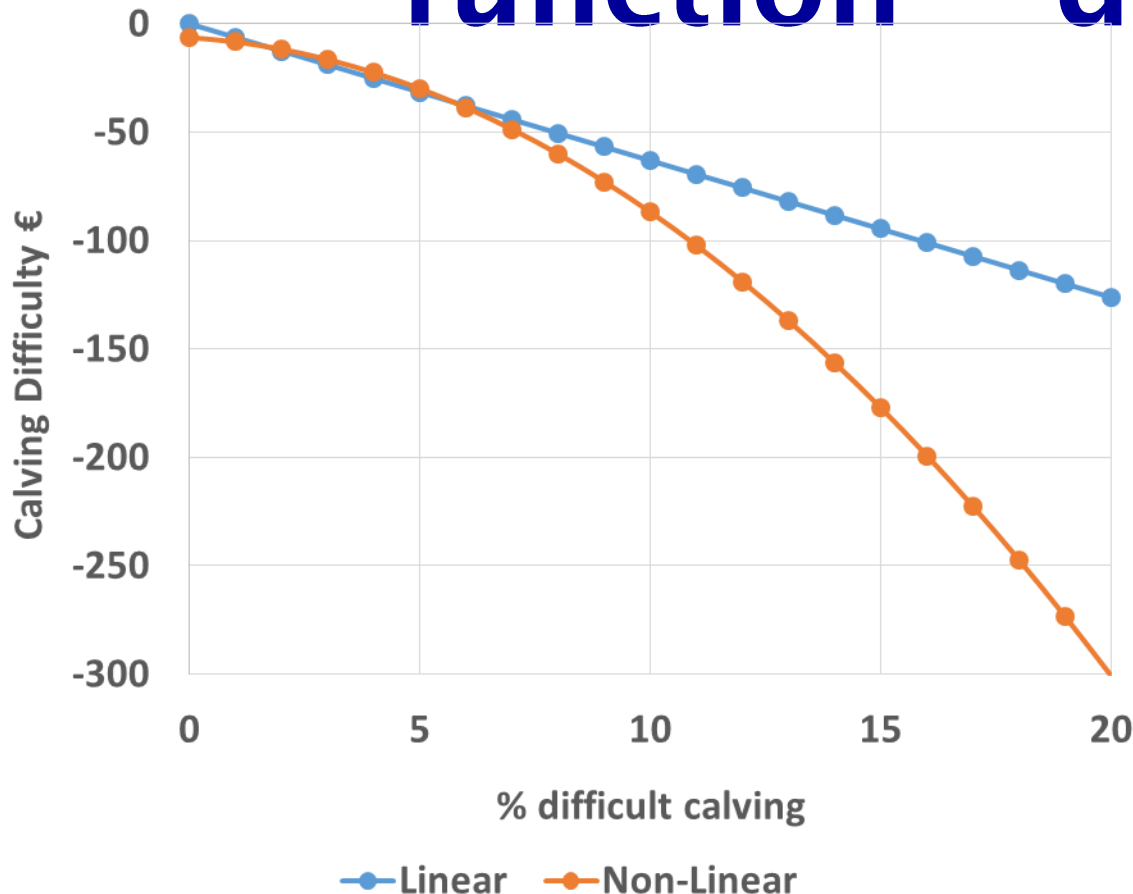
Maximum acceptable level of calving difficulty



Additional calf value required for an increase in



Proposed non-linear function – dairy



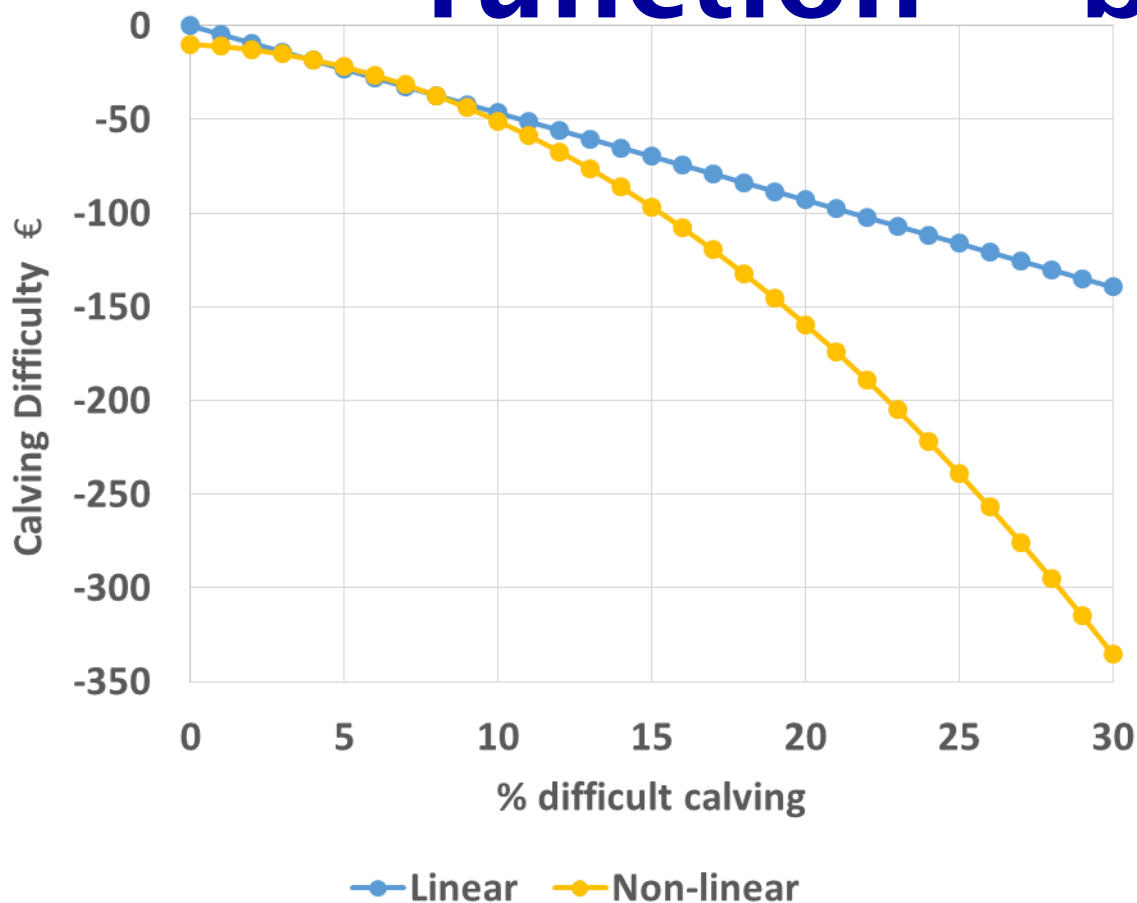
- **Curve from the survey results used as a base**
- **Linear economic weighting €6.31**
- **Shift from 4 to 5% difficult calvings in non-linear calving utility of €6.29**

Proposed non-linear function- dairy

Calving Difficulty	Calving Linear	Calving Non-linear
2.82%	-€17.76	-€9.58
5.63%	-€35.53	-€15.50
8.45%	-€53.29	-€65.59
11.26%	-€71.06	-€106.49

- Mean percentage of difficult calvings for a trial dataset was 5.63%
- Non-linear function starts to penalise heavily when calving difficulty is $> 8\%$

Proposed non-linear function – beef



- Curve from the survey results used as a base
- Linear economic weighting €4.65

Proposed non-linear function – beef

Calving Difficulty	Calving Linear	Calving Non-linear
4.37%	-€ 23.18	-€ 19.52
8.73%	-€ 46.36	-€ 41.92
13.10%	-€ 69.53	-€ 77.22
17.46%	-€ 92.71	-€ 125.40

- Mean percentage of difficult calvings for a trial dataset was 8.73%
- Non-linear function starts to penalise heavily when calving difficulty is $> 15\%$

Where next?

- Continue work on new calving proofs.
- Other questions still to be answered.
 - Dairy versus beef calving, heifers versus cows.
- Test proofs, including impact on new Dairy Beef Index (next) and also other indexes (e.g., Euro-Stars, EBI etc).
- Potential implementation of Dec 2015 (ahead of Spring 2016 buying season). ***If so requested.***

Dairy Beef Index

(incorporating non-linear calving utility)

Objective: Develop a breeding index for dairy farmers → select beef bulls



Traits influencing decision

1. Calving difficulty
2. Calf mortality
3. Gestation length
4. Calf price

Gestation length

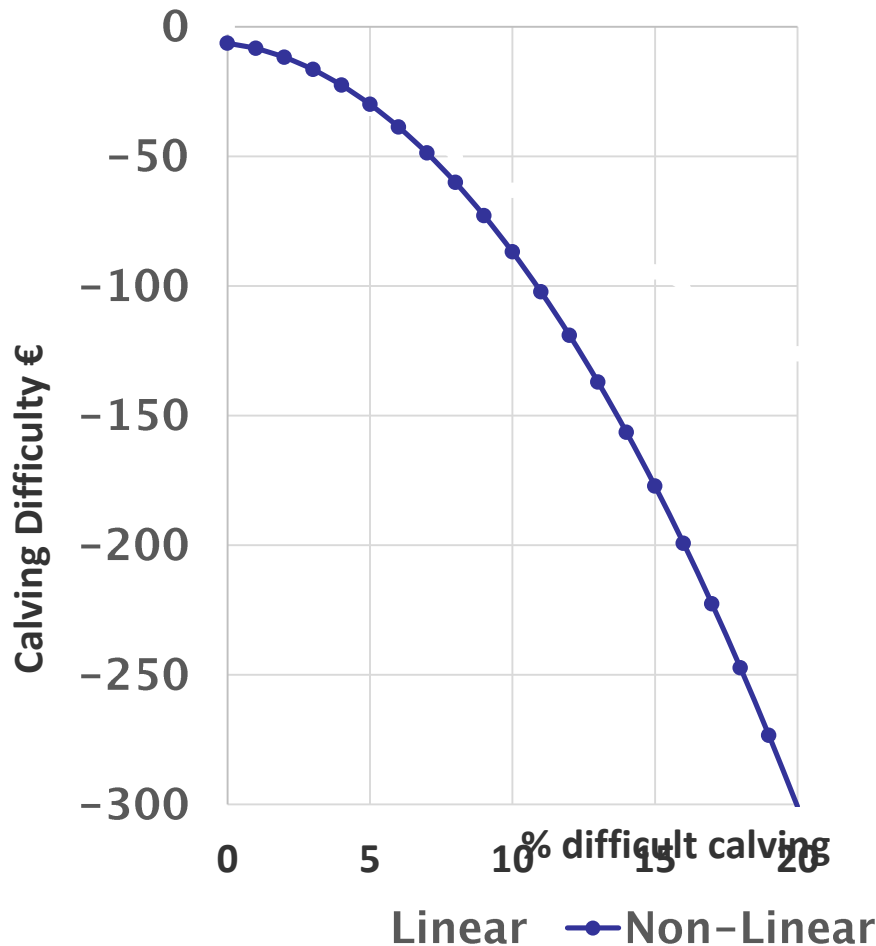
- **Accounts for:**
 - Loss in milk sales
 - Change in the feed budget
- Economic value -€3.00

Calves Sold

- Economic value implicitly assumed within the EBV of calf price
- Mortality rate for each bull is included in the economic value
- Economic value **€1.00*** **Mortality adjustment**

DBI incorporating non-linear calving function

- Pre
- Lir
- dif
- Proc
- Re
- no

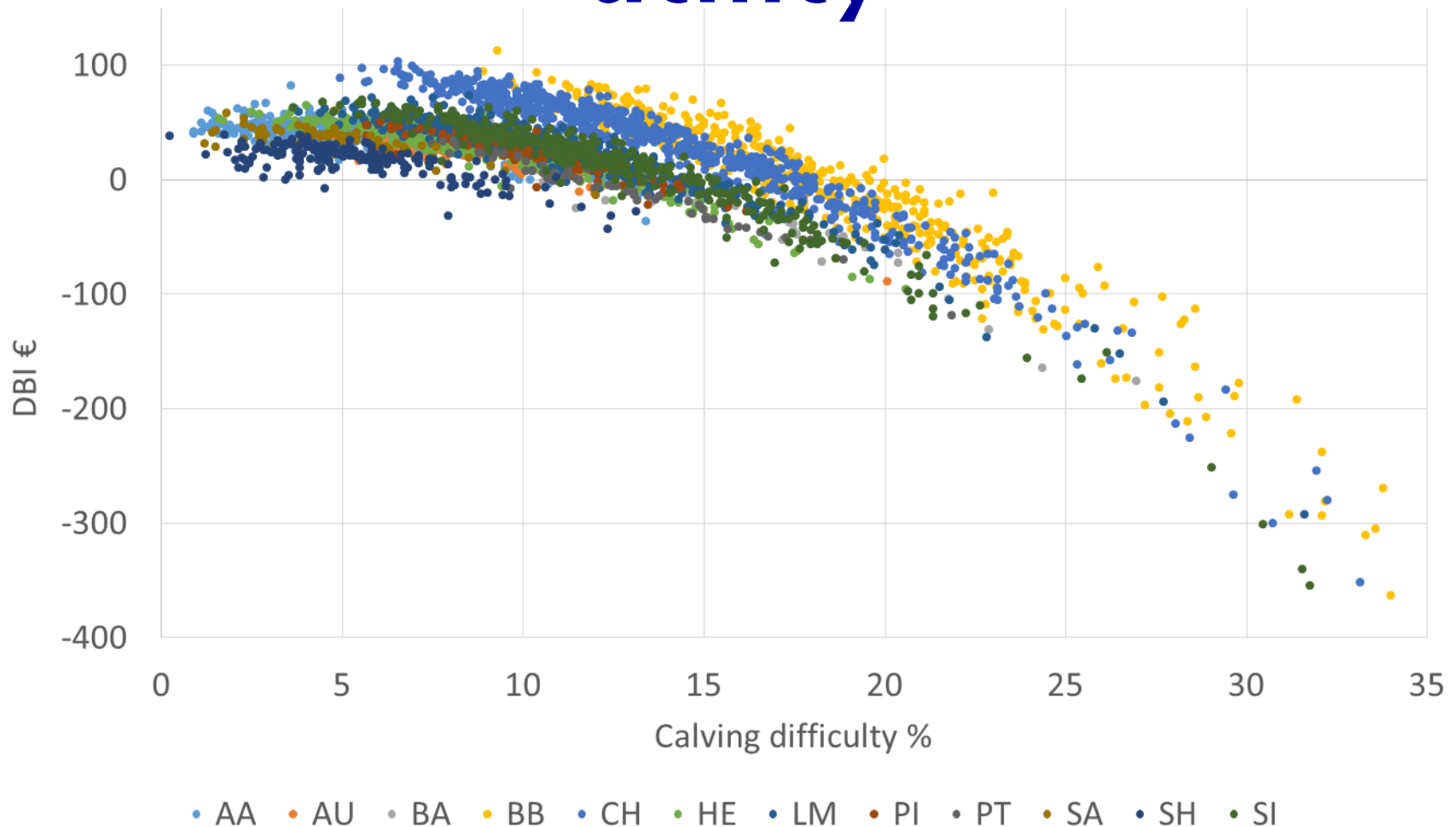


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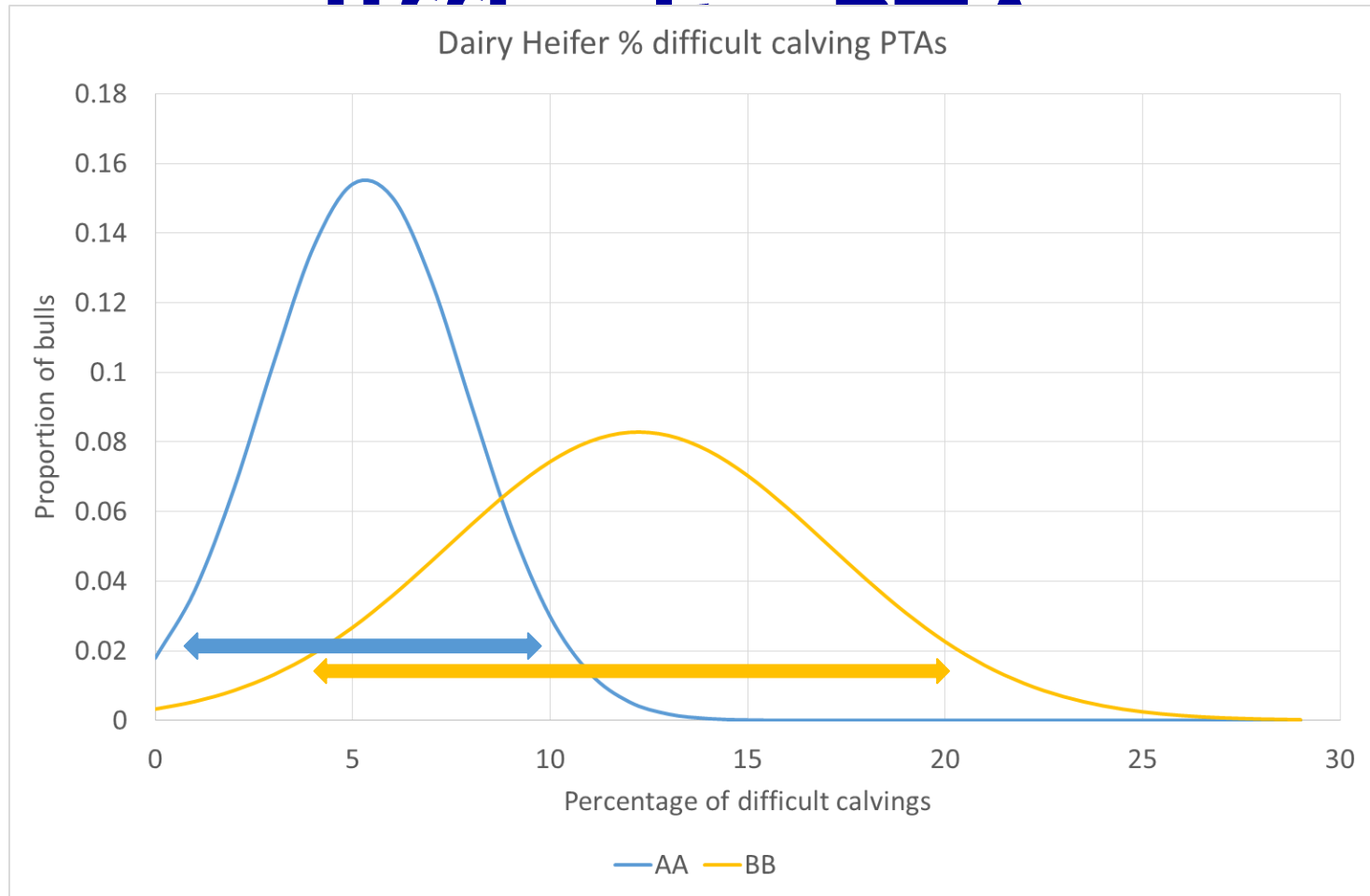
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DBI with non-linear calving utility

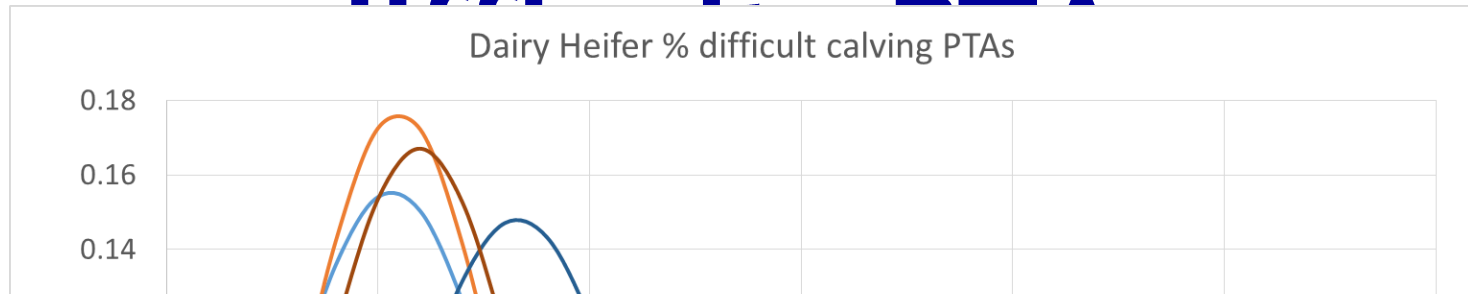
DBI formulation with non-linear calving function by breed



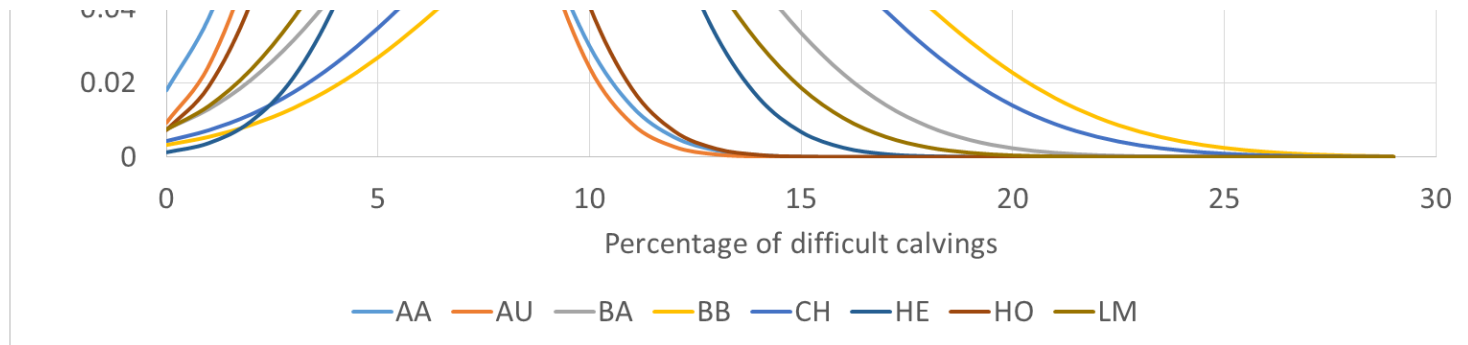
Variation in calving



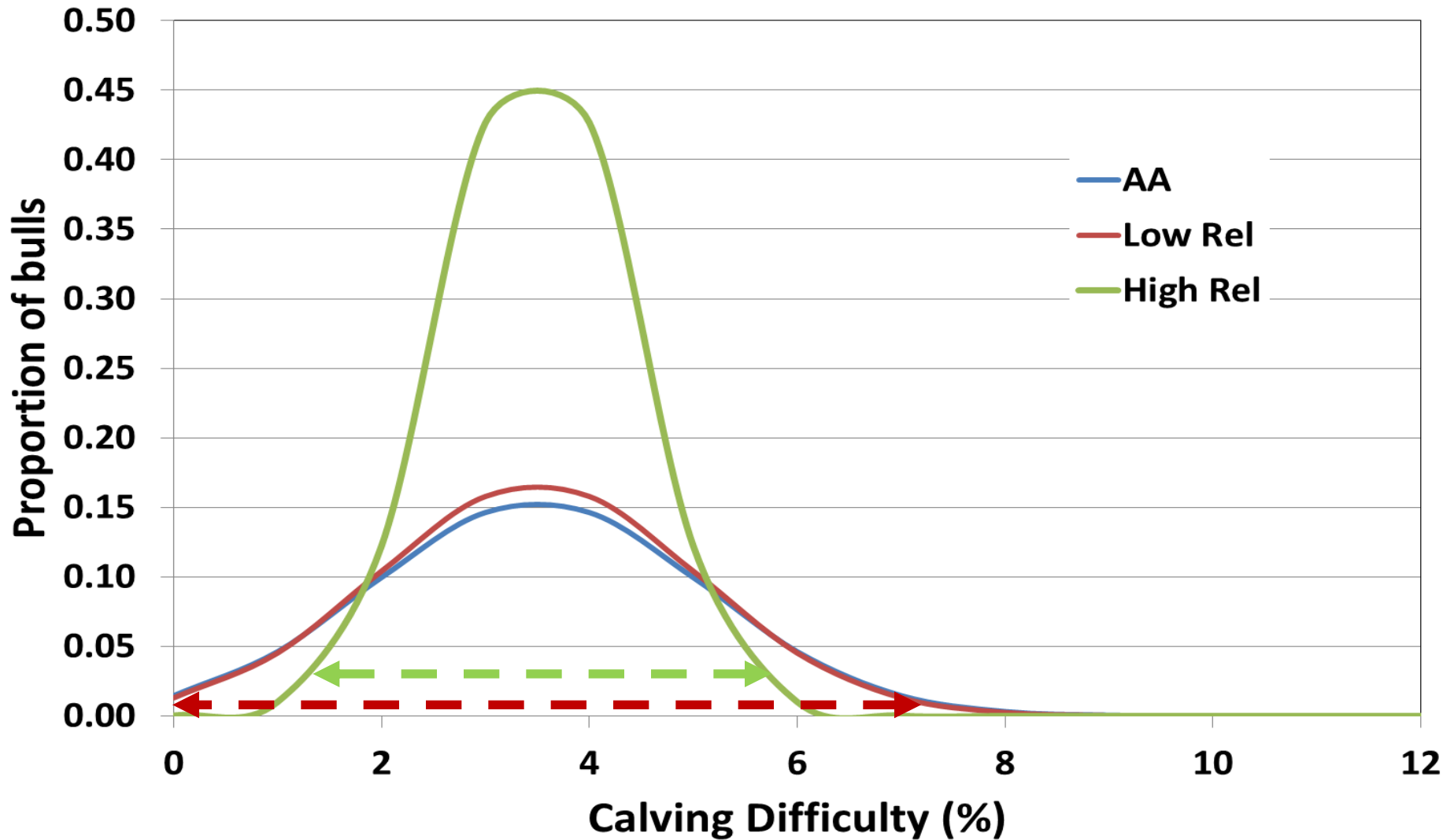
Variation in calving



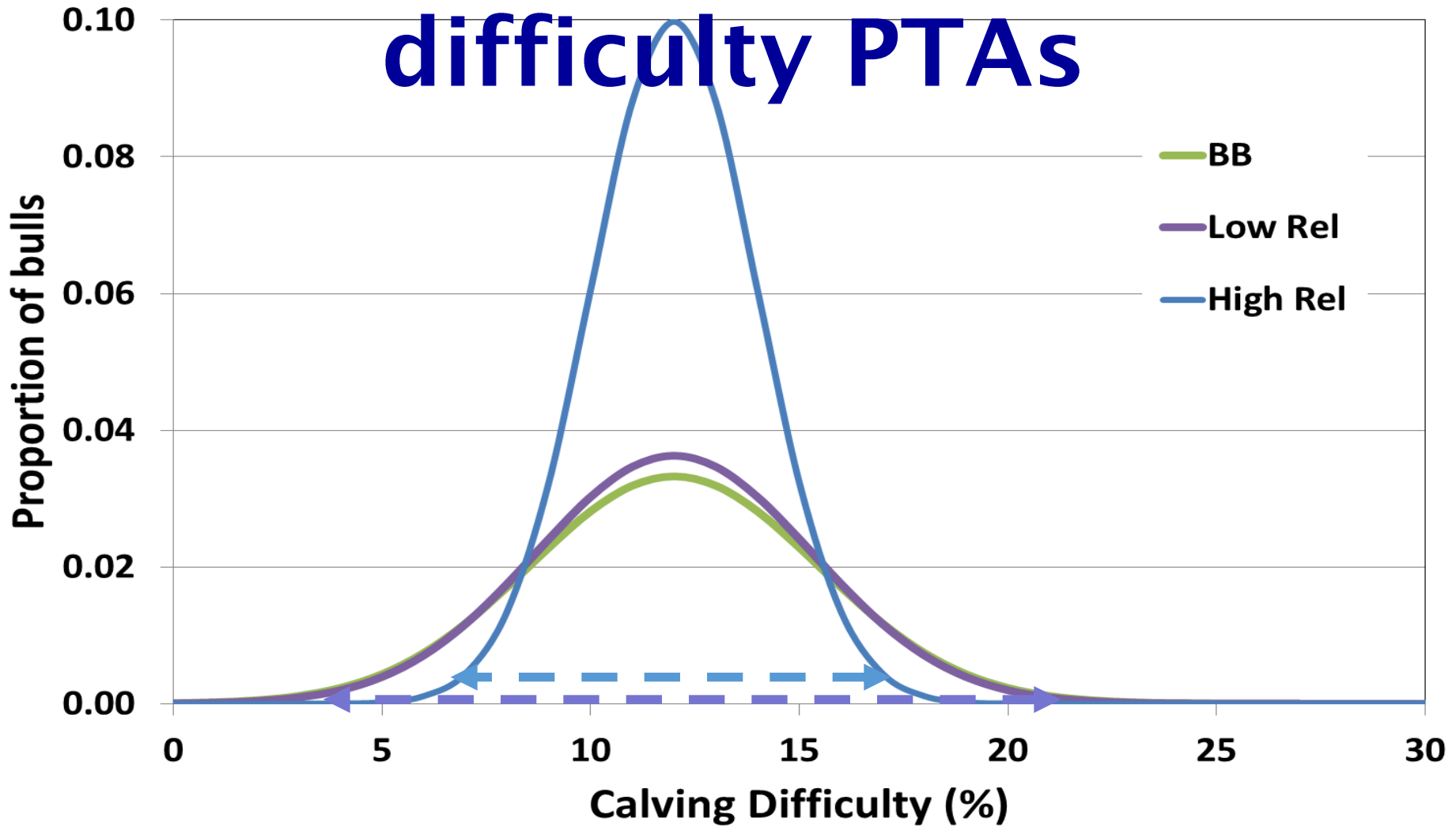
- Additional risk penalty based on:**
- 1. Variation in calving difficulty PTAs**
 - 2. Reliability of the bull**



Variation in calving



Variation in calving difficulty PTAs



Results to date...

Breed	DBI	Calf_Diff	CalfValue	Gestation
AA	3	2.7	31	-0.7
BB	-151	12.4	121	0.6
CH	-125	9.4	113	2.9
HE	12	4.9	54	1.1
LM	16	5.9	73	3.7
SI	-2	6.3	87	2.2

- Large variation within breeds

Where next?

- Continue work on DBI.
- Test proofs.
- Feedback welcome.
- Target for potential implementation of Dec 2015 (ahead of Spring 2016 buying season). ***If so requested.***



IRISH CATTLE BREEDING FEDERATION

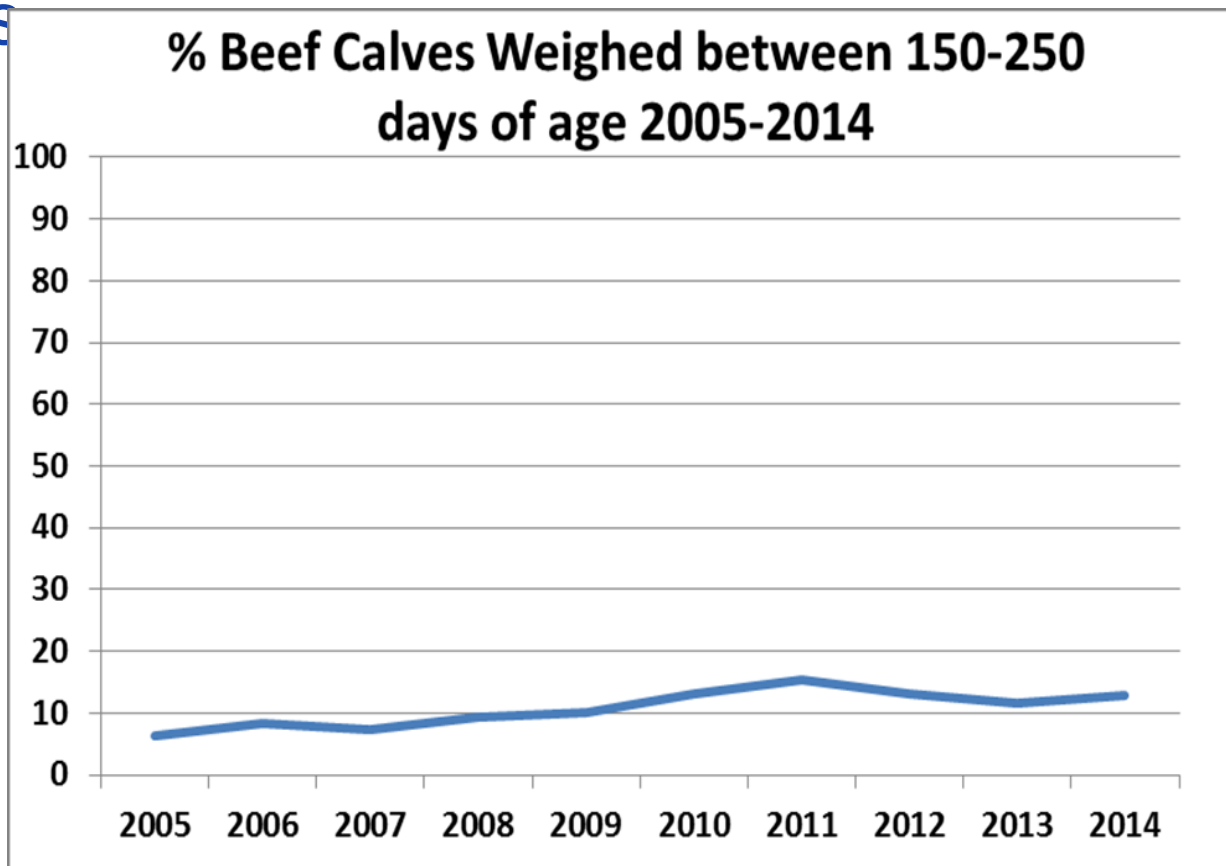
ICBF/Teagasc Maternal Weighing Project



Chris Daly/Aidan Murray



- Calf weights key to suckler cow milk performance analysis



- ~13% with weights in 2014.

- Assemble a core group of ~50 herds.
- Carry out comprehensive levels of weighing over 2-3 yrs.
- Analyse the correlation between calf performance and cow Replacement Index.
- Herds may be used for case study meetings by Teagasc.



- Herds required in all 12 Teagasc AMU's.
- Criteria (based on 2014 calving data):
 - Spring Calving (all calvings Jan-Jun)
 - > 20 calvings.
 - Calving Int. <390 days.
 - Calving Spread <16 weeks.
 - Sires recorded on >50% of cows
 - Teagasc clients.
- ~1,200 herds meet criteria.




- List forwarded to all Teagasc drystock advisors.
- Currently have 36 farmers signed up.
- Aidan Murray working closely with advisors to fill quota.
- Also looking to include Teagasc and Ag college herds.



Collection of Cow Milk Scores

The dams of your calves are listed below.
 Dam docility and dam milk ability must be recorded on all animals in this section.

Dam Ear Tag Number		Birth Date	Dam Docility	Dam Milk Ability
			VG = Very Good / Very Quiet G = Good / Quiet A = Average P = Poor / Difficult VP = Very Poor / Very Difficult (Ensure a value is circled)	VG = Very Good G = Good A = Average P = Poor VP = Very Poor (Ensure a value is circled)
	IE211098350461	2013-03-23	VG G A P VP	VG G A P VP

- Farmers will score all cows on milk (same as BDP)
- Must complete before any weighing.
- Compare scores to actual weaning weights (independent verification)
- Confirm strong relationship between cow milk scores and

First Weighing – July/Aug



- Weighing carried out by ICBF technicians.
- Cows and calves will be weighed.
- Mature cow weight an important part of replacement index.

Second Weighing – Oct/Nov



- Only calves required at second weighing.
- Maternal weaning weight data will be analysed in September, ahead of planned farm-walks.
- ICBF covering cost of weighing.

Questions