



IRISH CATTLE BREEDING FEDERATION

ICBF Cattle Breeding Consultation Meetings.

14th March 2012.



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Agenda

- **Dairy Industry Meeting. Time: 10 AM – 12.00.**
 - Genomics update – Francis Kearney.
 - Test day models – John McCarthy.
 - New management traits – Donagh Berry.
 - Linear type traits – Donagh Berry.
 - Linking EBI & profit – George Ramsbottom.
 - Developments in EBI (traits & economic values) – Andrew Cromie.
- **Dairy & Beef Industry Meeting. Time: 12.00 – 1 PM.**
 - Carcass image data – Thierry Pabiou.
 - New beef performance proofs – Ross Evans.
 - Use of foreign data – Ross Evans.
- **Lunch. 1 PM – 2 PM**
- **Beef Industry Meeting. Time: 2 PM – 4.30 PM.**
 - Best practice in cattle breeding – Stephen Conroy.
 - On-farm weight recording – Thierry Pabiou & Andrew Cromie.
 - Genomics – Donagh Berry.
 - Developments in Euro-Star indexes (traits & economic values) – Paul Crosson/Donagh Berry.
 - Euro-Star review – Andrew Cromie.



Genomics Update

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Genomic Update

- Moved to LD (6900 SNPs) chip this year
- Same cost as 3k
- Special offer on female genomics (€30)
- Expected Benefit of LD vs 3k
 - Increased imputation accuracy
 - Better call rates (use of different platform)
 - Can genotype animals of stock bulls even if not done on 50k (except for pure FR)

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Genomic Update

- Farmer requested females (2010 & 2011)
- AI companies
 - Pre-contracted animals done automatically
 - Letter of offer and one hair card is sent when bull is requested by more than one AI company
 - Contract with every hair card
- Teagasc Next Generation heifers

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Genomic Update

	Kits Requested	Kits Received	Dispatched to Lab	Received from Lab	Published
Farmers	8493	4369	3559	3206	2870
Industry	3660	2691	2467	1980	400*

* Results are issued to industry for 2 weeks prior to publishing officially

- Call Rates on average > 99%
- 87 out of 4000 < 90% call rate – these are re-sampled

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Genomic Update

- Turnaround times

	Issue Farmer	Return farmer	Send Lab	Return Lab	GEBI Publish	Total
FA	1	25	1	22	12	61
IND	1	7	1.5	6	6	21.5

Parentage

- Currently running at around 6.5% error rate on sire
- By checking against the sires on file we can reduce the error rate down to 1.5%
- Making changes and notifying farmers of non-pedigree registered animals
- Sending file of pedigree registered animals to IHFA and notifying farmers by letter of current status of these

Parentage

- Reasons for errors
 - Wrong straws used on cow (DIY & Technician)
 - Wrong code transcribed e.g. GYH -> GYK etc at insemination
 - Wrong sire recorded at birth (e.g. RVV -> RUU)
 - Wrong sample taken from the wrong animal
 - Calves tagged incorrectly at birth (DNA ear tag?)
 - Later insemination not recorded
 - Later insemination recorded - calves to previous insemination
 - Error in labeling semen at lab

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Parentage

- Critical Issue for the industry!
 - Farmers using AI tech are unhappy with errors
 - Farmers buying heifers whose sire has changed
 - Pedigree females with incorrect sires
- Impact on proofs??
 - 3-4% loss in annual genetic gain @ pedigree error rate of 5% - accumulation over time will have greater effect on genetic trends
 - Is there appetite for very low cost SNP parentage verification for all animals (could be done on voluntary basis)?
 - Minimum chip size is critical for verifying correct sire

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Summary

- Genomic process is working very well
 - Very good update
 - Excellent call rates
 - Excellent turnaround times (3 weeks for male calf)
 - Parentage errors can be reduced by 5%, but concern that they are high (6.5%, probably another 1-2% have incorrect dams)
 - Distribution of GEBI is as expected

Test Day Models for Milk Production Traits - Update

Background

- Currently use 305 day values
- Operated on contract by CRV Holland
- 305 day model uses one 305 day figure for Milk/Fat/Protein/Scs which summarises whole lactation
- The 305d figures are calculated using “lactation curves” software – assume lact curves just differ in level

What

- Change from 305 day model to test day model where all individual recordings are included in evaluation.
- Instead of calculating 305 day yield and then evaluating, evaluate actual individual test day yield
- Significantly more computation required
- Use new software
- Collaboration with Finnish research institute (MTT)

Why

- More accurate estimation of environmental effects from including the influence of particular days of recording
- Optimal use of information from all test days
- Better use of records in progress
- Model individual cow lactation curves
- Remove necessity of predicting 305d
 - 305d values will still be predicted
- Persistency evaluation
- Method of choice for many dairy evaluations internationally (NZ,NLD,CAN, ...)

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What is a test day model

- Existing model evaluates a single trait i.e. 305 day milk yield
- Models each daily milk yield at each stage of the lactation
- Uses Random Regression
- Can think of it as
 - *evaluating milk yield separately for each day of lactation*
- Same for fat/prot/scc
- As a bonus get persistency

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Genetic Parameters

- New model/methodology needs new parameters
- 570,231 records from 36,362 cows in 331 herds
- 2003-2010 data
- Parities 1/2/3 separate traits
- Parities 4/5 repeated records of parity 3
- Recall existing parameters
 - 0.35 heritability Milk/Fat/Prot
 - 0.11 heritability Scc

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Model

- Age Calving (*fixed*)
- Days dry (*fixed*)
- Days in calf (*fixed*)
- Herd/test day (*fixed*)
- Calving year*parity curve (*fixed*)
- Herd/Year curve (*random*)
- Permanent env curve (*random*)
- Animal genetic curve (*random*)

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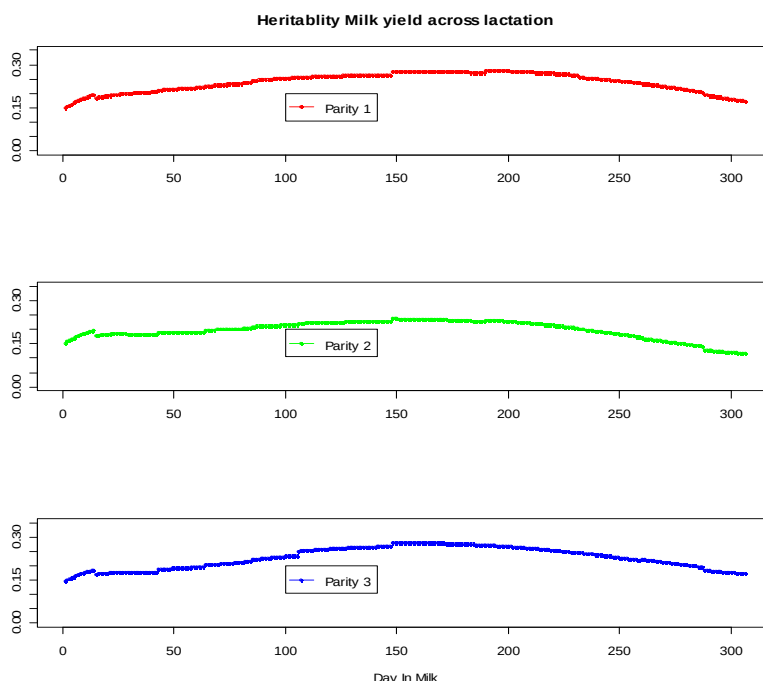
Model (Seasonality)

- Analysis was conducted if requirement to include seasonality in parameter estimation
- Conclusion – very little difference
- Model comparison using LogL/BIC
 - Compare results from AI bulls with/without seasonality
 - Correlations 0.99 in all cases for milk yield

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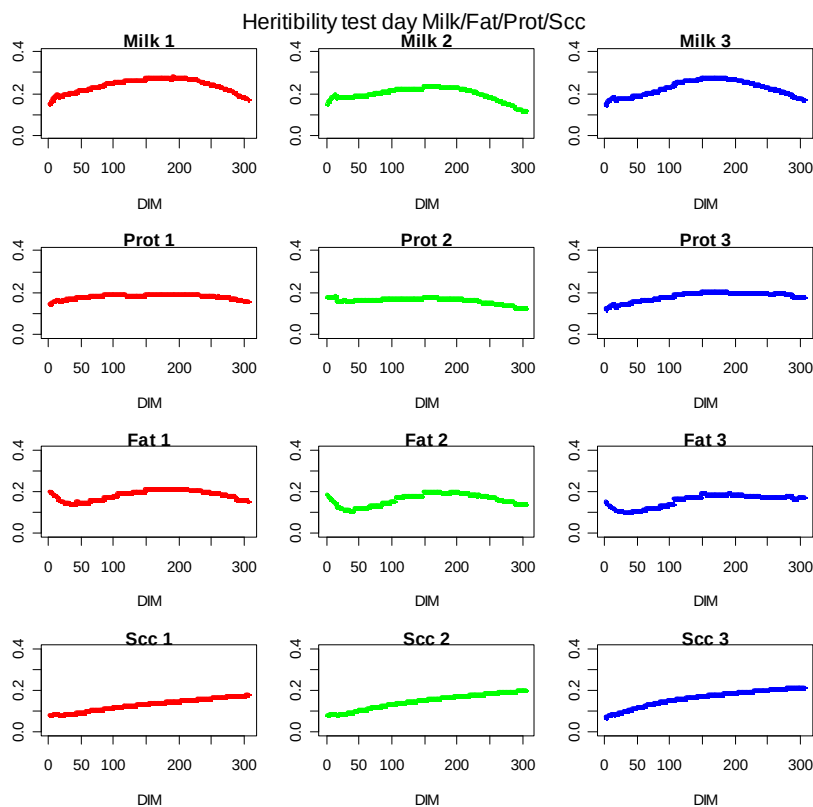
Heritability – Daily Milk Yield



- Heritability varies across lactation
- Also varies between lactations

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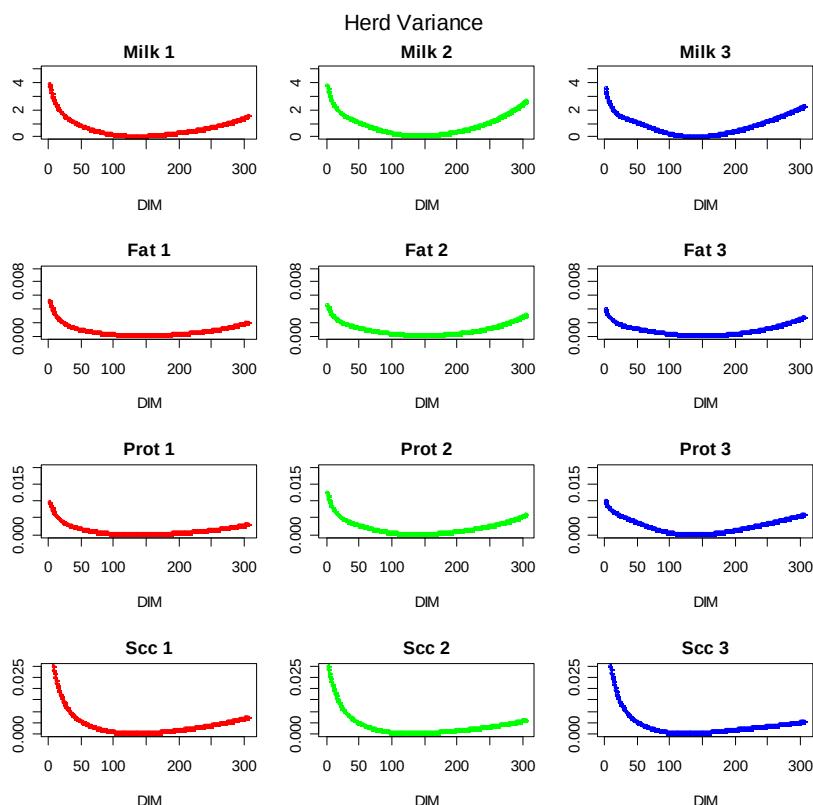




Heritability(milk)

- Slightly higher parity 1
- Highest middle of lactation
- Range 0.12-0.28
- Similar other studies
- 305d equivalent 0.32

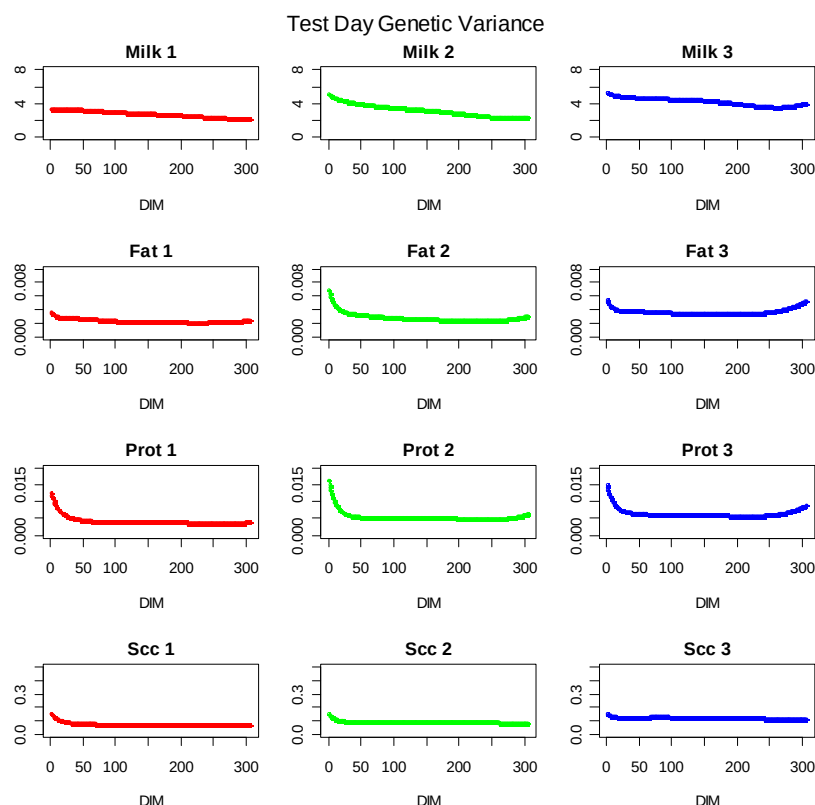
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- Variance explained by herd/year effect
- Maximum variance at start/end lactation
- New effect compared to previous model

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- Genetic variance
- Maximum at start of lactation
- Higher for later lactations
- Lact 2/3 mostly very similar

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Genetic correlations within lactation

Milk 1							
	5	55	105	155	205	255	305
5	1.00	0.85	0.69	0.55	0.44	0.39	0.38
55		1.00	0.96	0.87	0.78	0.69	0.59
105			1.00	0.97	0.92	0.84	0.70
155				1.00	0.98	0.93	0.79
205					1.00	0.98	0.87
255						1.00	0.95
305							1.00

Milk 3							
	5	55	105	155	205	255	305
5	1.00	0.87	0.70	0.56	0.46	0.37	0.28
55		1.00	0.95	0.87	0.77	0.63	0.40
105			1.00	0.97	0.91	0.77	0.49
155				1.00	0.98	0.87	0.59
205					1.00	0.95	0.73
255						1.00	0.91
305							1.00

Milk at start of lactation is only moderately genetic correlated milk with end of lactation

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Genetic correlations across lactation

		Milk 1 vs Milk 3							
		Milk 3							
		5	55	105	155	205	255	305	
Milk 1	5	0.77	0.67	0.53	0.40	0.31	0.25	0.18	
	55		0.86	0.81	0.73	0.64	0.52	0.33	
	105			0.88	0.84	0.78	0.66	0.43	
	155				0.88	0.84	0.74	0.51	
	205					0.87	0.79	0.58	
	255						0.82	0.66	
	305							0.71	

Milk is not identical trait across lactation,
correlation of about 0.80 between same
stage at parity 1 vs parity 3

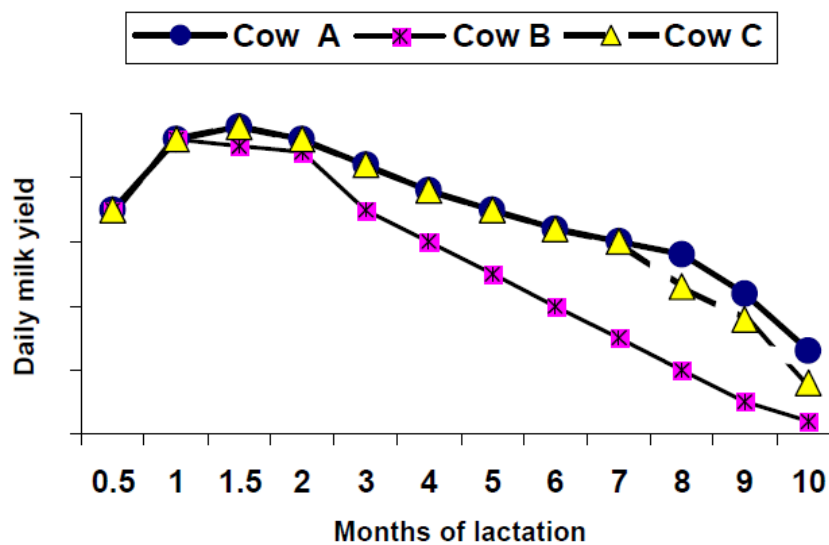


Persistence

- Bulls will have evaluation for milk yield, for each day in milk
- Allows calculation of persistency
 - Various definitions, measure of “flatness” of lactation curve
 - E.g. milk @ day 60 compared day 270
 - Relevant post-quota peak processing capacity issues
 - Need to consider most relevant measure in Irish context



Persistence



- Different cows have different shape lactation curves
- Can we select for “flatter” curves

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Next Steps

- Further research on parameters, esp parity 3
- Heterogeneity of variance correction
 - Variances across levels – e.g. bulls used in high/low production level herds
- Breeds/Heterosis & Recombination/Genetic groups
- Test genetic trends/correlations existing model

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Next Steps

- Interbull test run Sept 2012
 - Indication of validity of model
- Potential test proofs
 - There will be changes, esp cows and low rel bulls
- Significant further refinement before official implementation
- Official implementation – 2013?

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Genetic evaluations for management traits

Donagh Berry

Teagasc, Moorepark

Irish Cattle Breeding Federation Industry Consultation Meeting, March 2012

Milk production - John MacCarthy
Fertility - Revised evaluations
Calving difficulty - Under-construction
Surplus calf - Noirin + Thierry
Health (& disease) - DEP - last meeting
Type - Jessica
Management
Environmental footprint
Welfare
Product quality



The Irish Agriculture and Food Development Authority

Management Traits

Temperament / docility

Milking speed

Likeability / satisfaction

Milk leakage

Calf viability



The Irish Agriculture and Food Development Authority

Data sources

IHFA classification

- Temperament - $h^2=0.10$
- Milking speed - $h^2=0.11$
- Limited number of animals

Gene Ireland

- Temperament
- Milking speed
- Leakage
- Limited number of animals



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Data sources

DEP

- Temperament - $h^2=0.14$
- More animals

DIY milk recording

- Milking speed & temperament
- 33% of herds use DIY
- Flow rate every 5 seconds
 - Milking duration
 - Avg. flow rate
 - Max flow rate

 **DEP Health Notification Form** DEP 4 

Herd owner: JOHN SMITH
Herd no: IE1234567
Print date: 15-Sep-2011

Every animal listed below should be given a milking temperament score
Circle mastitis or lameness events only where they have occurred

Listed below are cows currently in your herd or cows which calved since 01-Jan-2011

Cow Jumbo	Tag Number	Last Calving Date	Lact. No.	Milking Temperament Score VG = Very Good G = Good A = Average P = Poor VP = Very Poor (circle relevant)	Mastitis 1 = 1 case 2 = 2+ cases (circle relevant)	Lameness 1 = 1 case 2 = 2+ cases (circle relevant)
2-1	IE1234567 90182	17/02/2011	9	(VG) G A P VP	1 2	1 2
8-1	IE1234567 50162	10/04/2011	8	(VG) G A P VP	1 2	1 2
9-1	IE1234567 70180	10/05/2010	7	VG (G) A P VP	(1) 2	1 2
255	IE1234567 70255	10/01/2011	7	VG G (A) P VP	1 2	1 (2)
256	IE1234567 80256	22/04/2011	7	VG G (A) P VP	1 (2)	1 2
259	IE1234567 20259	10/02/2011	6	VG (G) A P VP	1 2	1 2
265	IE1234567 90265	20/03/2011	6	VG (G) A P VP	1 2	1 2
275	IE1234567 20275	12/05/2011	7	VG (G) A P VP	1 2	1 2



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New variance components (Jessica for type traits)

Genetic correlations between the “same traits” from multiple sources.

- For example, temperament from DEP, IHFA, GENRE IRELAND & EDIY meters?

Useful as predictors

- Milking dynamics and mastitis over and above the contribution of SCC

Genetic evaluation

- Multi-trait including milk yield

Genetic evaluations for linear type traits

Genetic evaluations for Ireland and Great Britain undertaken as a single evaluation

- $r_{g\text{IRL},\text{GBR}}=1$

Possible issues with evaluations?

- Age adjustment.....

Undertake genetic evaluations in Ireland based on Irish research

- Variances (& h^2) are population specific
- Test the model using just Irish data
- UK (and other international data) exploited through INTERBULL

January 2012

Replicate EXACTLY what was always
done but just using Irish data

Submitted for INTERBULL test run in
January 2012



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Old (www.icbf.com) v new

Trait	All	Reliability >90%
STA	0.90	0.91
CW	0.82	0.95
BD	0.88	0.92
ANG	0.91	0.96
RA	0.86	0.96
RW	0.81	0.91
FUA	0.81	0.94
RUH	0.87	0.96
US	0.84	0.93
UD	0.84	0.95
TPS	0.85	0.87
TL	0.86	0.95
RLS	0.76	0.93
LOCO	0.72	0.9
FA	0.77	0.92
Overall	0.84	0.84
Udder	0.85	0.94
Legs	0.80	0.92

	GBR & CAN	IRL & CAN	GBR & IRL
Stature	0.97	0.93	0.98
Body Depth	0.85	0.84	0.97
Angularity	0.91	0.92	0.99
Rump Angle	0.97	0.95	0.99

Issue

Used an older version of PEST genetic evaluation software

Did not read the far right of the file properly

All traits were OK except

- RLRV, FTP, composites of legs, udder and overall
- Now rectified

What next?

Data with IB centre.

Expect feedback & results within next week.

Organise meeting with IHFA & AI companies to discuss “test” results, including plans for 2012+



The Irish Agriculture and Food Development Authority

Validation of the EBI using eProfit Monitor data

George Ramsbottom¹, Donagh Berry² & Andrew Cromie³

¹ Teagasc, Oakpark, ² Teagasc, Moorepark, ³ ICBF

Irish Cattle Breeding Federation Industry Consultation Meeting, March 2012



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Only includes measureable (or correlated) factors that are known to influence profit

Derived from a single bioeconomic model

Objective

To evaluate the association between herd average genetic merit and overall performance including financial

~2000 farmers

Milk performance, variable costs, fixed costs,
gross margin, net margin

- Per litre, per cow and per hectare

Years 2007 to 2009

Average genetic merit for individual traits and
EBI (2009 economic values) for >75% of the
lactating cows



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Results

EBI is on a PTA not EBV basis so a €1 change
in EBI of a cow should translate to
€2/lactation change in profit ($EBV = \frac{1}{2}PTA$)

1 unit change in EBI was associated within
€1.94 change in net profit per lactation



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Milk and fertility subindex

	Variable costs	Fixed costs	Net margin	Milk price
EBI	-0.13	-0.13	0.22	0.52
Production	0.15	0.04	0.11	0.29
Fertility	-0.28	-0.14	0.09	0.24

Conclusions

Across a relatively large dataset the expected responses to selection on EBI is within expectations

Milk production and fertility are equally important in influencing net margin



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Developments in EBI

Andrew Cromie.



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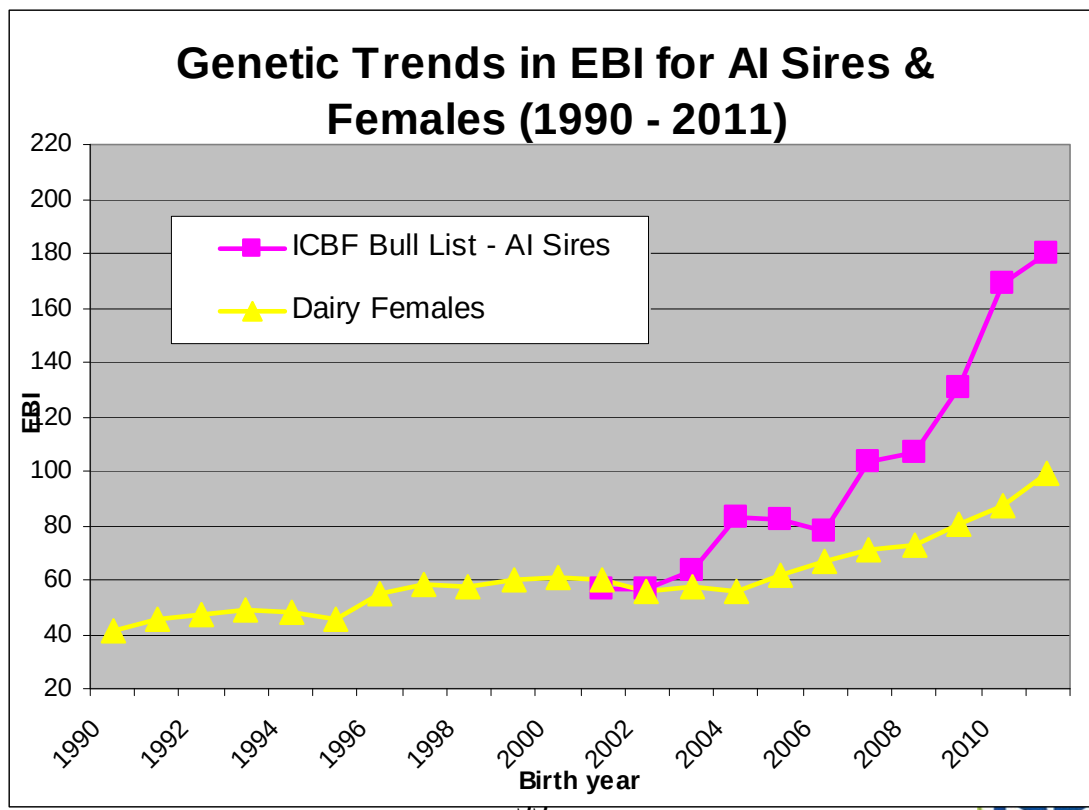
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Background.

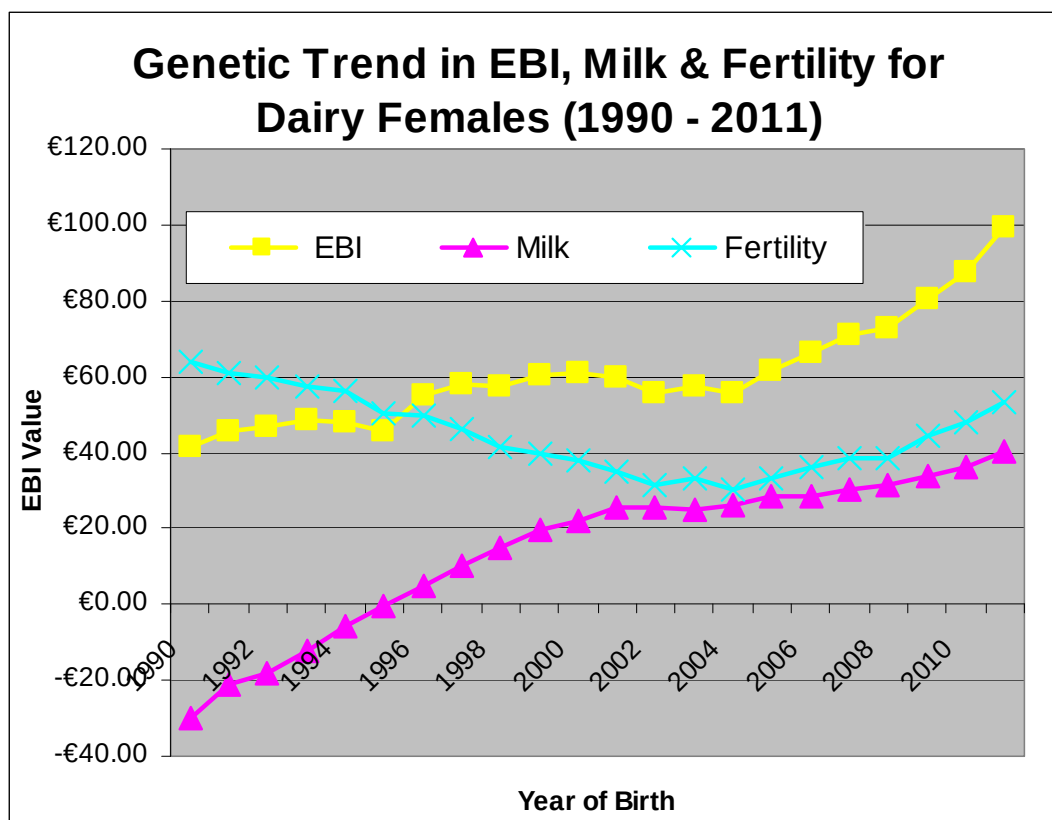
- Genetic Gain.
- Where next for EBI?
 - New traits.
 - New economic values.
- Discussion.



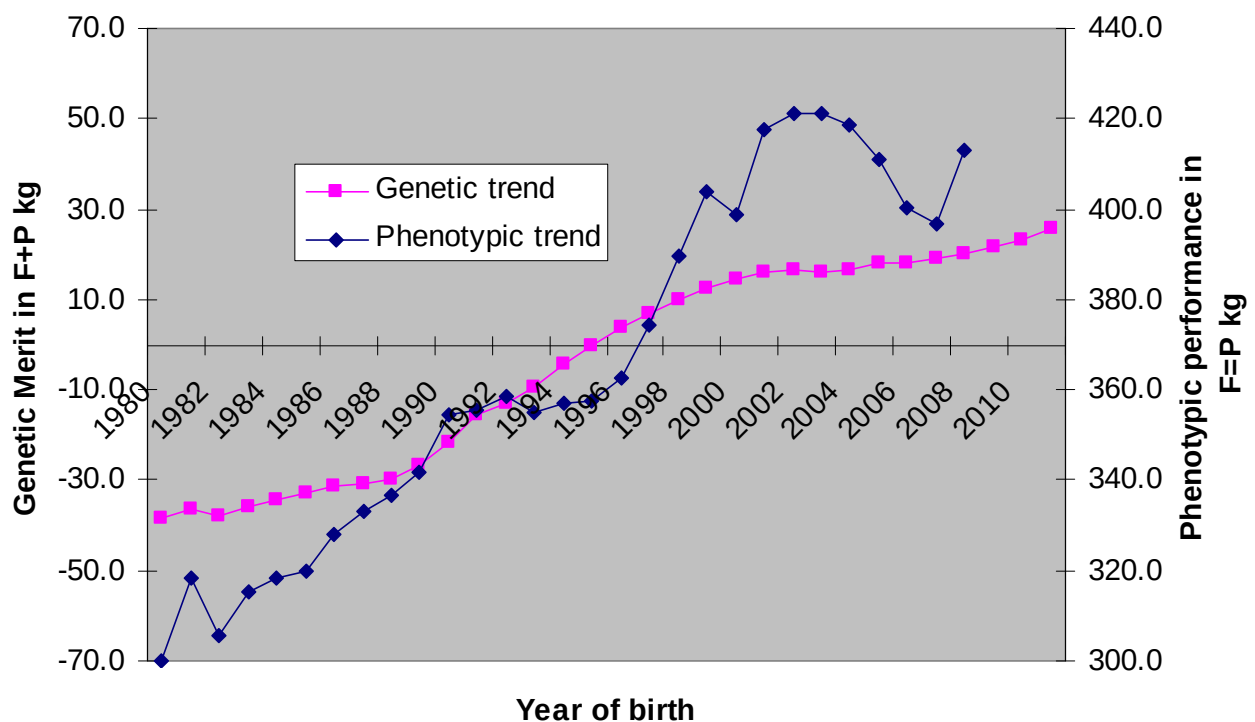
Genetic Gain EBI – AI Sires & Cows



Genetic Gain EBI – Dairy Females



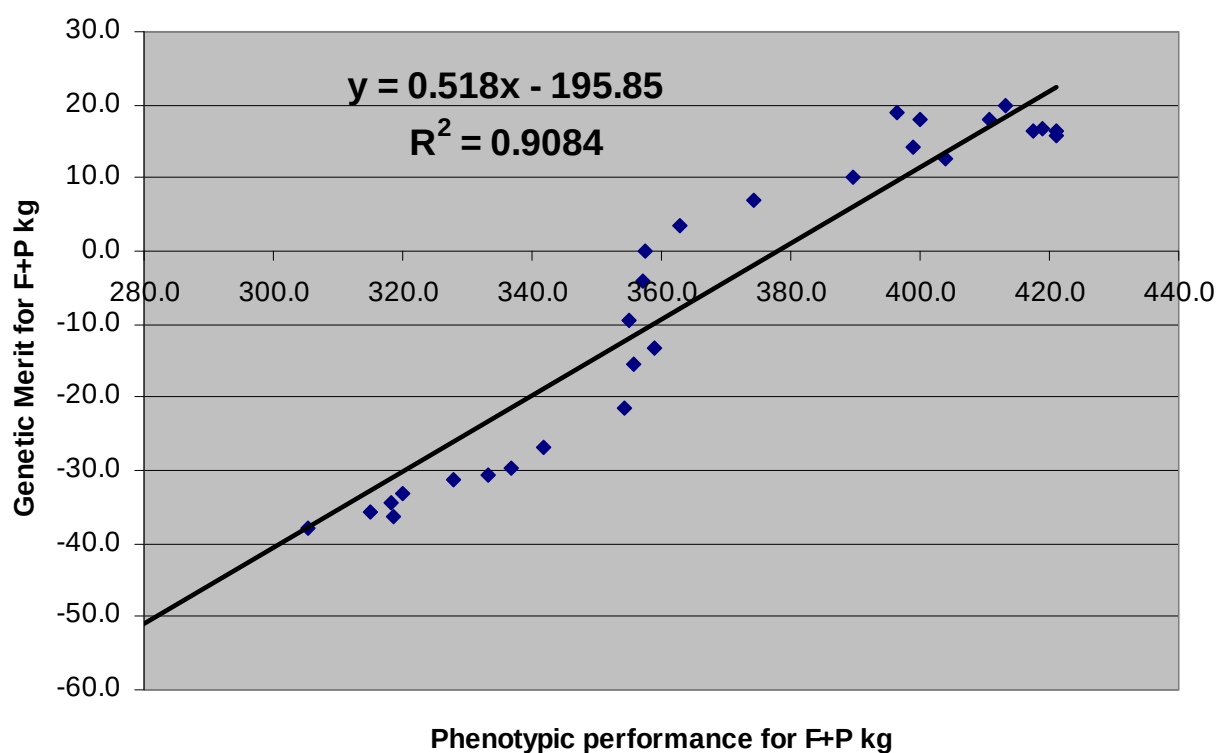
Genetic and Phenotypic Trends for F+P kg for dairy females (1980-2011)



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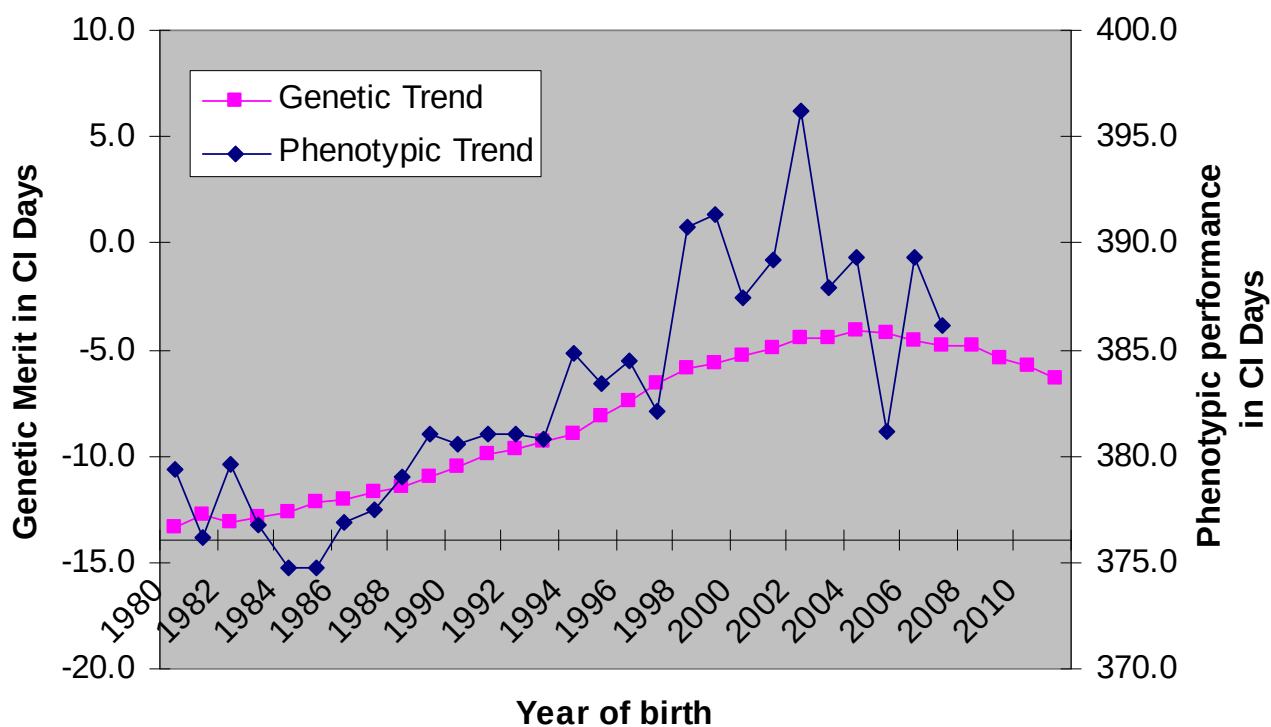
Regression of genetic merit for F+P kg on phenotypic performance for F+P kg



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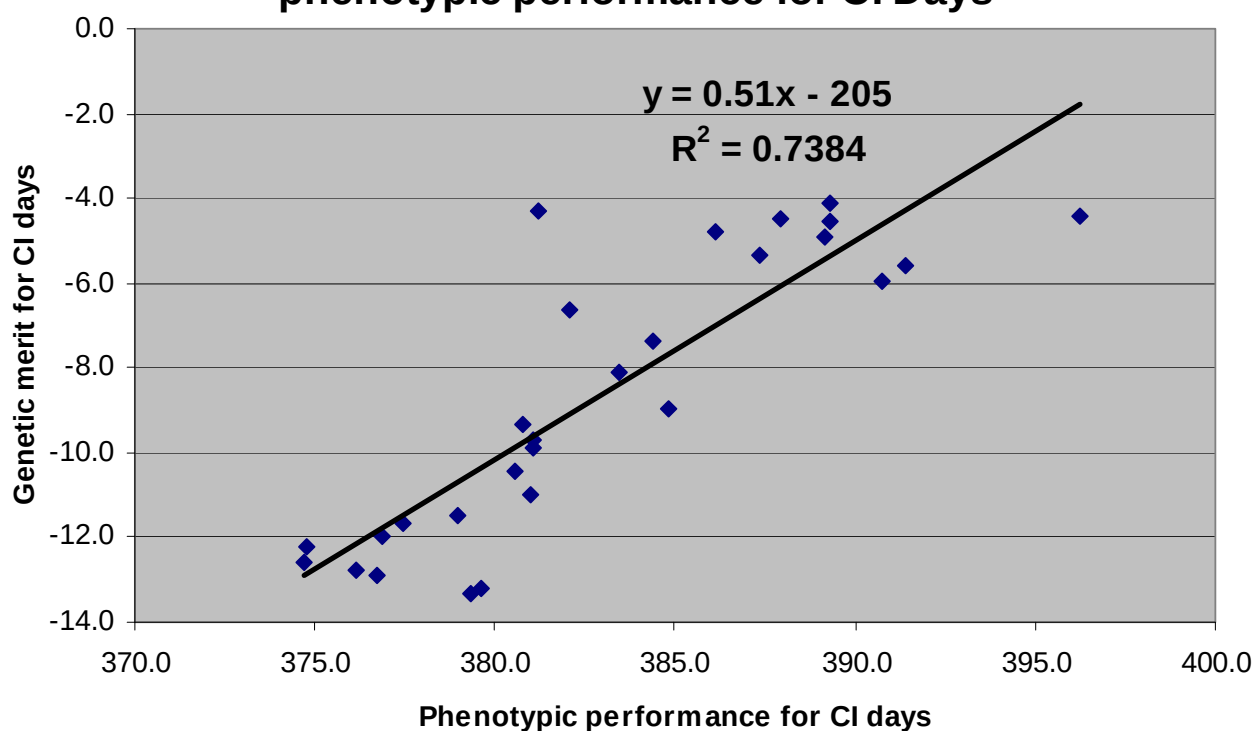
Genetic and Phenotypic Trends in Calving Interval for Dairy Females (1980-2011)



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Regression of genetic merit for CI Days on phenotypic performance for CI Days



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EBI – 2012.

Sub-index	Trait	Economic value	Relative emphasis	Relative emphasis
Milk	Milk yield (kg)	-0.09	10%	35%
	Fat yield (kg)	1.01	4%	
	Protein yield (kg)	6.26	21%	
Fertility	Calving int. (days)	-11.89	25%	34%
	Survival (%)	12.05	8%	
Calving	Direct calv. Diff. (%)	-3.52	2%	8%
	Maternal calv. Diff. (%)	-1.73	1%	
	Gestation (days)	-7.5	4%	
	Perinatal mort (%)	-2.58	1%	
Maintenance	Maintenance (kg)	-1.49	7%	7%
Beef	Carcass wt. (kg)	1.38	7%	13%
	Carcass conf. (scale 1-15)	10.32	3%	
	Carcass fat (scale 1-15)	-11.71	2%	
	Cow Carcass wt. (kg)	0.15	1%	
Health	Somatic cell count (log _e units)	-56.35	3%	3%
	Locomotion (units)	1.13	1%	

New traits for genetic evaluation.

- Health traits.
 - Mastitis.
 - Lameness.
- Beef traits.
 - “Drop calf” quality.
 - Cow live-weight.
- Management traits.
 - Temperament.
 - Milking speed.

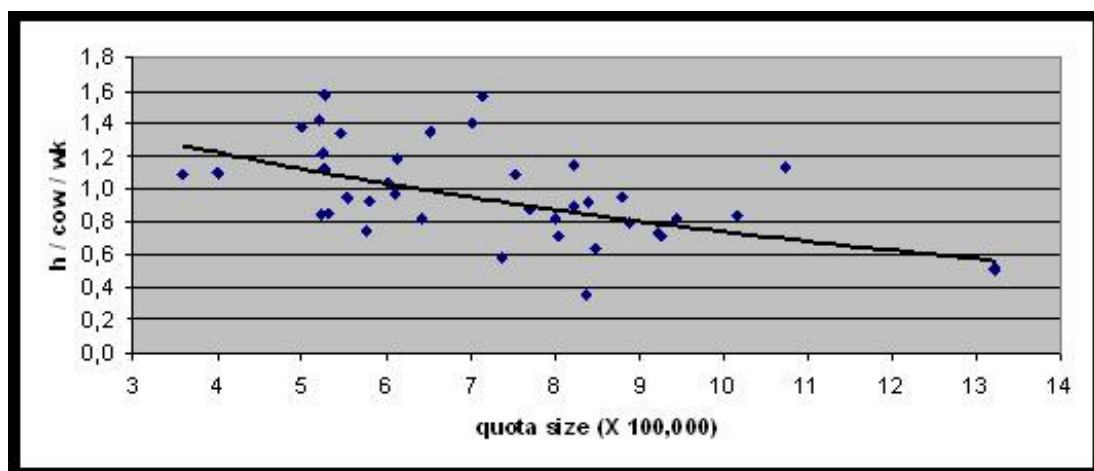
Health & Beef Sub Index.

- Health sub-index.
 - Currently SCC & locomotion score.
 - New MA and LM evaluations.
 - Update economic values.
- Beef sub-index.
 - Currently beef (cwt, cconf, cfat + cull cow cwt) & maintenance (cull cow cwt).
 - New “drop calf” quality trait. Closer to what happens on most farms, but; (i) avoid double counting, (ii) assumes dairy & beef herds are separate.
 - New “cow live-weight” trait (as opposed to cull cow cwt). Better handle on cow maintenance).
 - Update economic values.

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New labour sub-index.



- Increasing herd size will result in less time available to spend per cow.
- Farmers want “easy-care” cows.

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Labour index & EBI.

- Cost of labour is currently included into some aspects of EBI.
 - Labour associated with difficult calving's.
- Not included in other aspects of EBI.
 - Repeat breeders.
- Objective is to; (i) identify key “labour” traits (& sub-traits), (ii) develop economic values, (iii) compare relative importance of labour vs other sub-indexes, & (iv) consider inclusion in EBI.

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Approach.

- Survey two groups of ICBF HerdPlus farmers.
 - Simple scoring (~2000 herds). Via web.
 - Simple scoring & more complex ranking of cows (~200 herds). Classroom style.

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What are the key labour traits?

- Four groups of traits identified:
 - Milking process.
 - Cow health & care.
 - Calving & calf care.
 - Female fertility.
- Sub-traits identified within each of these main traits, e.g., milking process (milking speed, temperament & milk yield).
 - Note: all sub-traits are routinely evaluated.

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How do we derive economic values?

- Develop economic values based on;
 - “Simple” scoring of each trait & sub traits (1-10 basis).
 - “More complex” ranking of cows with different attributes to establish trait preference and relative importance.
 - Rank the following 12 cows, with different attributes, e.g., slow milker, good temperament & average yield versus next.

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How do we include in EBI?

- How important is labour in context of other traits in EBI?
 - Milk, fertility, cost of labour.....
 - Are we confident that we can avoid potential double-counting?
- Generate lists of cows & bulls.
 - Do the proofs make sense? Are cows with high indexes “easier to manage”?

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Where next?

- Develop material – Now.
- Survey farmers – July.
- Collate data and calculate economic values – August/September.
- Present results & feedback – October.
- Decide on whether to publish & or include – November/December.

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Summary.

- Working on traits and economic values for EBI 2013.
 - Health traits
 - Beef traits.
 - New labour index.
 - “General” review of EV’s in EBI.
- Updates on future meetings.
- Decisions in December 2012.

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Using digital images from meat factory

An update

Thierry Pabiou – ICBF

Dairy & Beef industry meeting

14/03/2012

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Current assessment of carcass quality

- The EUROP carcass classification
 - Assessment of conformation & fat grades by experts/machines



S > E > U > R > O > P
15 > > > > > > > 1



1 < 2 < 3 < 4 < 5
1 > > > > > > 15

=> Current selection tool for carcass quality

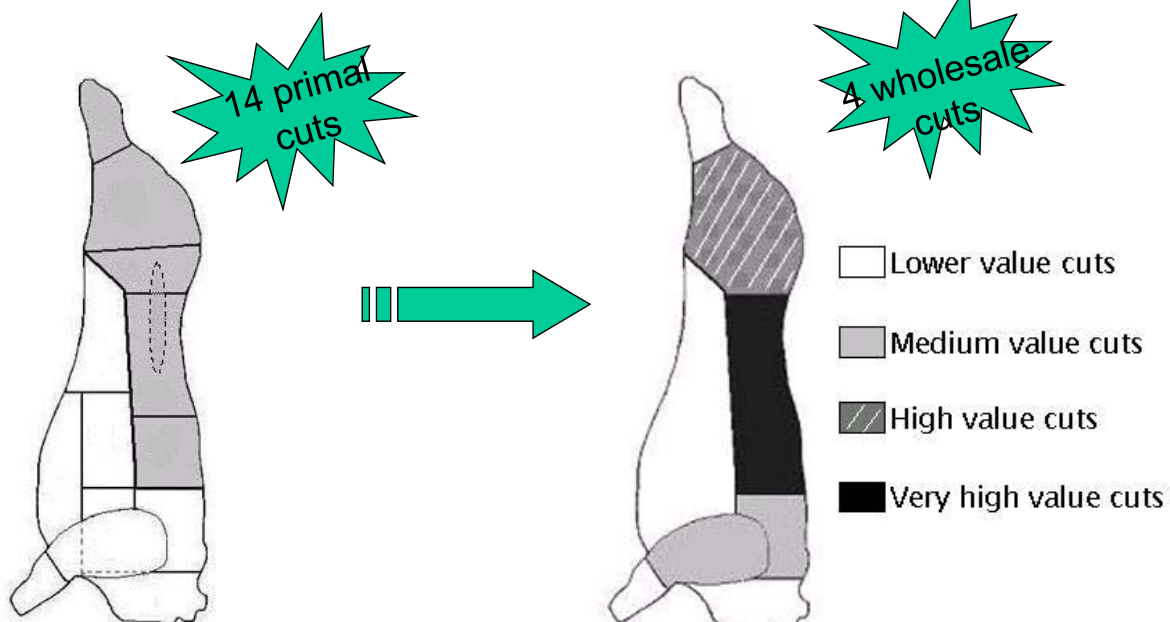
EEC Regulations n° 1208/81 ; 2930/81 ; 1026/91

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Motivations

- Improving carcass quality

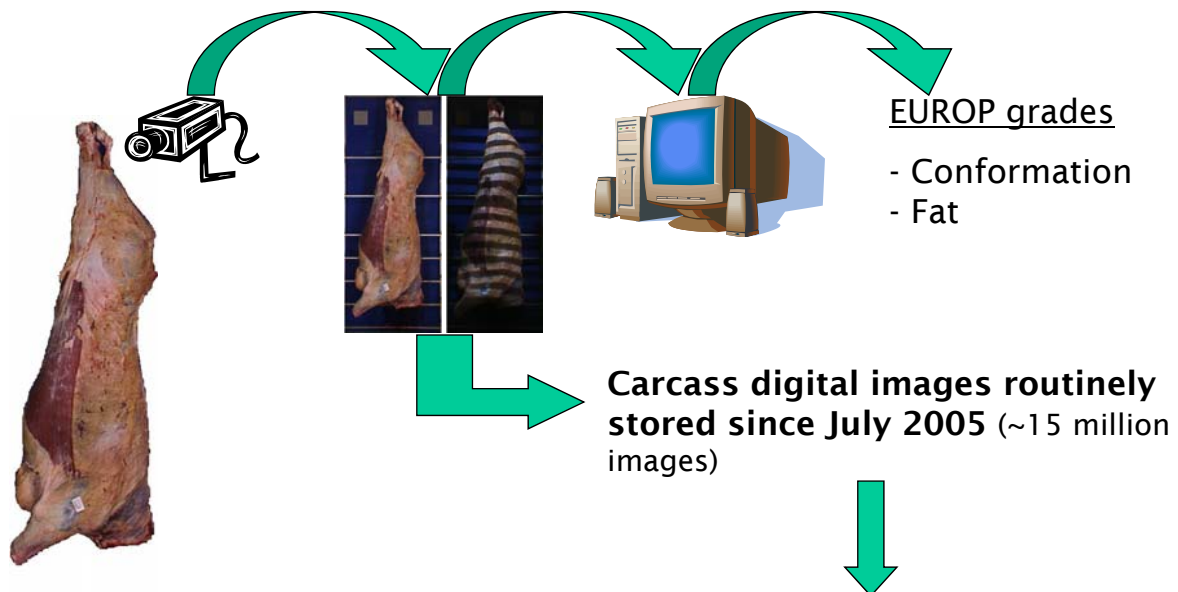


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Data used

• Mechanical grading images



Predict carcass cuts from images?

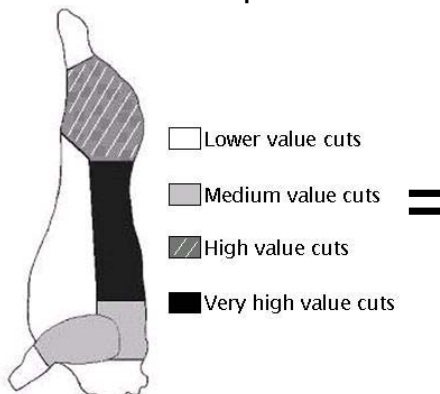


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Method

• Multivariate analysis

- to build prediction equations (Paper II)



428 variables
(contour, length,
volume,
surface...)

- Calibration (2/3 data) / validation (1/3 data)
- Stepwise regressions

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Accuracy of prediction

- R^2 of regressions

Wholesale Cut Weight	Dataset	
	Heifer	Steer
Lower Value Cuts	0.65	0.92
Medium Value Cuts	0.70	0.86
High Value Cuts	0.85	0.93
Very High Value Cuts	0.72	0.84

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Creating new data

- Prediction equations established
 - For 4 wholesale cuts
 - in 2 genders (steers & heifers)
 - Using stepwise regression

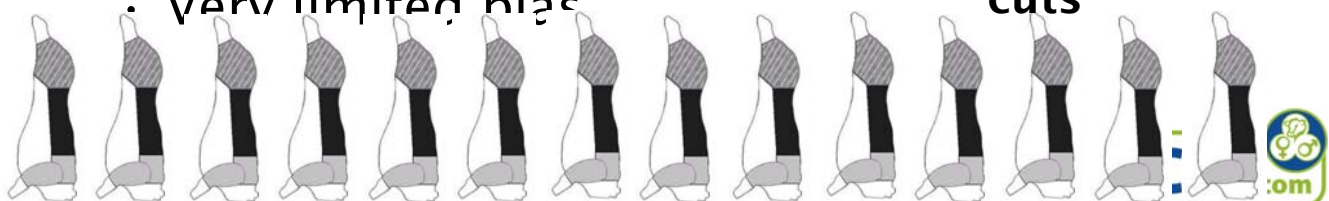
- Good Accuracy



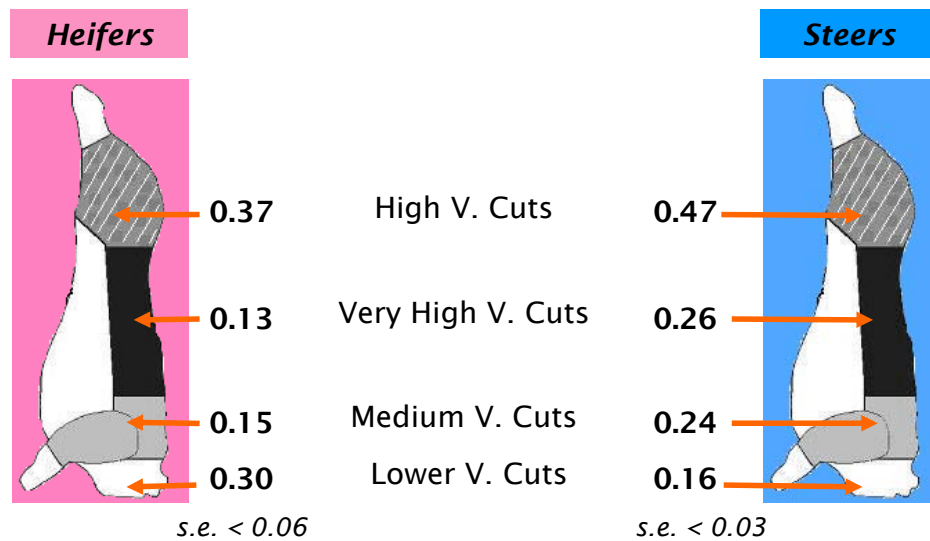
Access to large supply of carcass cuts

- Very limited high

cuts



Heritability



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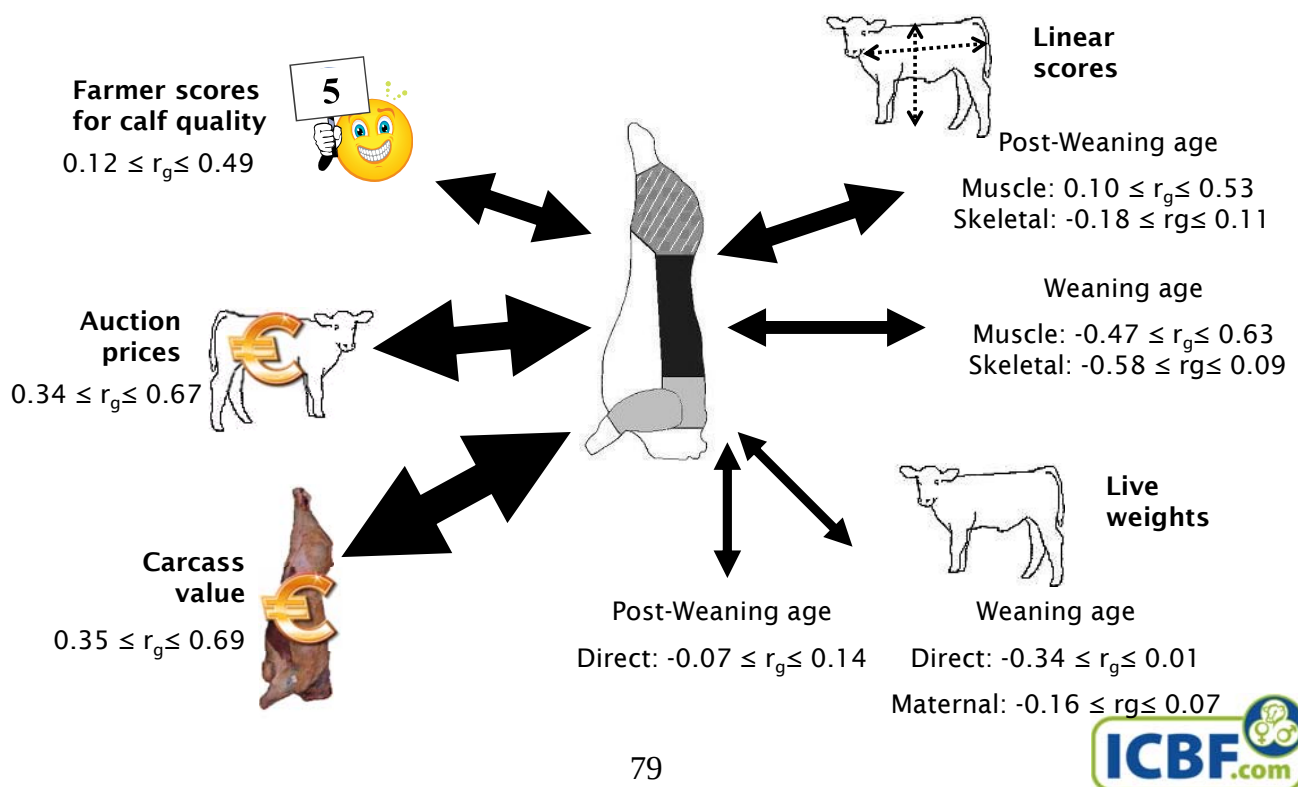
Genetic correlations

	Steers Heifers				
	Carc. Weight	Low. V. cuts	Med. V. cuts	High V. cuts	Very H. V. cuts
Carcass weight		0.4	0.32	0.43	0.45
Lower V. cuts	0.26		0.45	0.66	0.57
Medium V. cuts	0.10	0.47		0.79	0.86
High V. cuts	0.26	0.80	0.82		0.89
Very H. V. cuts	0.38	0.69	0.82	0.82	

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Relationship with other pre-slaughter traits



Main Conclusions

- Using phenotypes predicted from VIA for selection purpose is feasible
 - Accurate regressions equations for steers and heifers
 - Routinely available supply of predicted carcass weights
- and beneficial for the Irish industry
 - Exploitable genetic variations
 - Strong genetic associations with early predictors
 - Auction price at weaning and post-weaning
 - Including predicted cuts in a selection index
 - increased responses Suckler Beef Value => selected sires give more profitable progenies

Recommendations

- Integrating the new traits in the current genetic evaluation
- Streamlining the process of cut conversion
- Strengthening current prediction equations
 - Heifers
 - Ybulls
- Forecasting re-calibration of equations
- Finding way of collecting phenotypes on a regular basis
- Investigate meat quality

Beef Performance evaluation Review

*Ross Evans
Killeshin Hotel, Portlaoise.
14th March 2012.*

	Current evaluation: 20 traits	New evaluation: 30 traits
Weight traits Pedigree and Commercial		Birth weight
		10-50 day wt
		50-150 day wt
	150-300 day weight	150-250 day wt
	300-600 day weight	250-350 day wt
		350-450 day wt
		450-550 day wt
		550-700 day wt
Commercial weanling quality traits		Cow liveweight
	calf quality score	calf quality score
		Dairy calf price
	150-300 mart price	150-350 mart price
Pedigree weanling quality traits		350-700 mart price
	Width at withers	
	Width behind withers	Muscle Composite
	Loin Development	(5 traits, incl. Thigh width)
	Development of Hind Quarter	
	Height at withers	Skeletal Composite
	Length of back	(4 traits, incl. Width at Hips)
Performance station traits	Length of pelvis	
	Feed intake	Feed intake
Carcass traits	Ultrasound Muscle	Ultrasound Muscle
	Carcass weight	Carcass weight
	Carcass conformation	Carcass conformation
	Carcass fat	Carcass fat
		Very high value cuts
		High value cuts
		Medium value cuts
		Low value cuts
	Cull cow carcass weight	Cull cow carcass weight
Foreign trait ebvs		Cull cow carcass conformation
	Foreign EBV weaning wt	Cull cow carcass fat
	Foreign EBV Muscle	Foreign EBV weaning wt
	Foreign EBV Skeletal	Foreign EBV Muscle
		Foreign EBV Skeletal



Exclusion of data on a herd level

- Current editing is based on individual animal performance being within 3 standard deviations of the breed mean
- Also contemporary group size of 5 in a two month period
- **Proposal for new evaluation**
- Editing done at a herd level with threshold data quality index necessary
- Editing at an individual animal performance also necessary but possibly at a higher deviation i.e. 4 standard deviations from the mean

Contemporary groups

- Current groups include male and female with a fixed effect of sex
 - Weight and quality traits: male + female
 - Carcass traits: Steer, heifer and bull
- Proposal: Separate contemporary groups for all traits post 250 days of age

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Options around linear scoring

	Current evaluation	New evaluation
Weight traits Pedigree and Commercial		Birth weight
		10-50 day wt
		50-150 day wt
	150-300 day weight	150-250 day wt
	300-600 day weight	250-350 day wt
		350-450 day wt
		450-550 day wt
		550-700 day wt
		Cow liveweight
Pedigree weanling quality traits	150-350 days	250-350 days
	Width at withers	
	Width behind withers	Muscle Composite
	Loin Development	(5 traits, incl. Thigh width)
	Development of Hind Quarter	
	Height at withers	Skeletal Composite
	Length of back	(4 traits, incl. Width at Hips)
	Length of pelvis	

Option to move Linear scoring to 250-350 days if 2 weights recorded on animal

i.e. 150-250 previous weight and 250-350 weight on day of scoring

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Use of Foreign EBVs

- Currently using
 - Direct + maternal weaning weight
 - UK (400 day growth + 200 day milk)
 - Muscle and Skeletal
 - UK (Ultrasound muscle), France (Linear scoring)
- Correlations with new traits will need to be reviewed
- Could potentially look at extra traits
 - Birth weight (Calving)
 - 200 day direct weight (UK)
- Selective dataset of animals received is an ongoing problem i.e. animals used in Ireland with access to foreign ebvs not necessarily representative of the whole population in country of origin

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Best practice for beef breeding

Stephen Conroy, Pat Donnellan &
Ross Evans ICBF
14th March 2012



Background

- ❖ No document in place at present
- ❖ Uncertainty for some breeders about indexes
- ❖ Help communicate and resolve queries

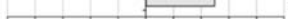


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Objectives

- ❖ To outline the steps involved in obtaining accurate Euro-Star indexes
- ❖ Interpret Euro-Star indexes in beef cattle

€ uro-Star Indexes					
% Rank	Star Rating (within breed)	Indexes & Traits	€ uro-Value	Data Reliability	Relative Data Reliability Comment
99%	★★★★★	Suckler Beef Value (SBV)	€ 189	92%	High
85%	★★★★★	Weanling Export	€ 60	93%	High
99%	★★★★★	Beef Carcass	€ 135	96%	High
62%	★★★★	Daughter Fertility	€ 57	55%	High
35%	★★	Daughter Milk	€ 79	80%	High
Other Key Traits					
45%	★★★	Calving Difficulty	5.8%	97%	High
25%	★★	Gestation Length		90%	High
81%	★★★★★	Docility		93%	High
GROW Linear Score Evaluation (Within-Breed Percentiles)			BLUP Composites (Within Breed)		
Animal scored. Linear scores and weaning weights in evaluations					
Width at withers	Narrow		Wide	Data Reliability	Rank
Width behind withers	Narrow		Wide	Muscle 112 97%	88%
Lean Development	Thin		Thick	Skeletal 106 97%	69%
Dry hind quarter	Low		High	Function 98 82%	38%
Thigh width	Narrow		Wide	Comments	
Height at withers	Small		Tall		
Length of back	Short		Long		
Length of pelvic	Short		Long		
Width at hips	Narrow		Wide		
Locomotion	Poor		Good		
Breed percentile					
Feet and Leg Descriptions					
Head by side view	Straight		Sicked	Comments	
Head by rear view	Toes out		Toes in		
Feet by front view	Toes out		Toes in		
Standard deviations from breed average					

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Contents

1. Overview of €uro-Star Indexes
2. Changes to beef genetic evaluations in 2012
3. Steps in obtaining accurate indexes

1. €uro-Star Indexes

- ❖ Overview of the €uro-Star index which includes:
 - Understanding SBV and sub-indexes
 - How indexes are calculated
 - Variation in Indexes
 - What is reliability
 - Why indexes change
 - How often are €uro-Stars updated

2. Changes to beef evaluations

❖ Milk evaluation

- Cow milkability score
- Foreign milk data
- Relationship between terminal and maternal traits

❖ Fertility evaluation

- Age at first calving
- Calving interval and survival – 11th parity
- Use of predictor traits

❖ Cow docility evaluation

- Optional cow survey

❖ Calving ease evaluation

- Foreign data

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3. Steps to accurate indexes

❖ Pedigree/commercial herds

- Sire selection
 - Reliability
- Imported stock bulls
 - Ensure all information is entered on the database
 - How to increase reliability
- Flushing & Embryo transfer
 - How to record events
- Insemination
 - Timeliness and where to record the trait
- Registration
 - Timeliness
- DNA parentage (pedigree)
 - Recommended where multiple stock bulls or AI and stock bulls are being used

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3. Steps to accurate indexes cont'd

- Suckler Cow Welfare Scheme
 - Traits to be recorded and timeliness of each trait
- Weight recording
 - Key times in the animals life to weight record
- Linear scoring
 - Criteria involved and information on scoring
- Cow docility and milkability survey
 - Information on the survey
- Missing sires (commercial)
 - Where to record this information

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3. Steps to accurate indexes cont'd

❖ Management:

- Genetic evaluations take into account within herd effects
- Over and under prediction of Euro-Star Indexes
- Inconsistency in management within herd include:
 - Preferential treatment
 - Selected animals
 - Linear scoring
 - Not scoring all eligible animals
 - Intentionally adding a poor quality animal
 - Not informing the linear scorer of different management practices
 - Docility
 - Over handling of selected animal
 - Use of chemical agents
 - Manipulating docility records

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Where to next?

- ❖ Feedback welcome
- ❖ Finalise editing
- ❖ Send copy to all pedigree and commercial breeders, website, HerdPlus journal etc.
- ❖ Target: End of March 2012
- ❖ Updated annually

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IRISH CATTLE BREEDING FEDERATION

Herd Data Quality Index.

Stephen Conroy.

Background.

- Ensure accurate data.
 - Exclude herds with poor quality data
 - Reward herds with high quality data
- Voluntary program.
- Initially available to pedigree breeders.
- Linked to the best practice document.
- Easy to interpret format.

Objective.

- An index to help breeders improve quality of data for beef breeding

Herd Data Quality Index.

1. Herd summary score card:

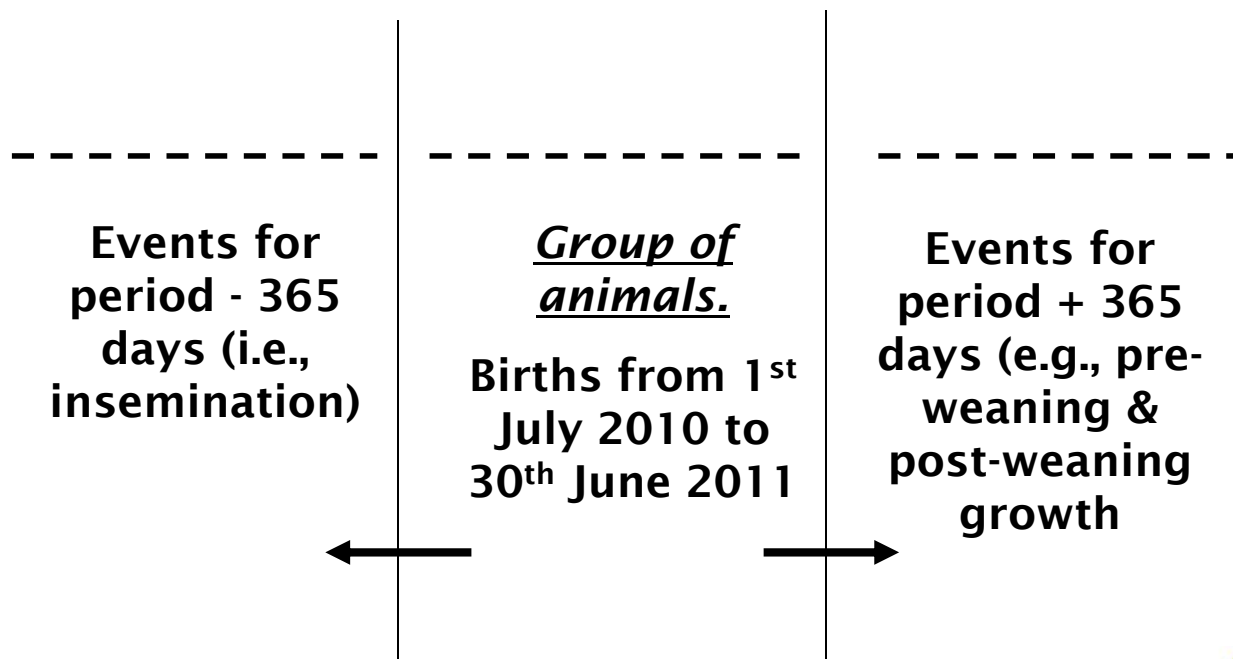
- Completeness of data
- Timeliness of data
- Accuracy of data
- Overall score

2. Individual animal report

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How will it work?



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Herd Data Quality Index. Births during 2010/2011

LoCall 1850 600 900

Herd owner Farmer A
Herd designator IE1234567
Print date 01/07/2012
Page 1 of (5)

Table 1. Herd summary data.

This report is based on birth registration events that took place on your farm during the period 1st July 2010 to 30th June 2011 (18 birth registration events in total). The report evaluates the level of data recorded against each of these events (nine events in total) and provides an evaluation of your herds data quality, based on completeness, timeliness and accuracy, for recording of these nine events. In addition an average score is given for each quality criterion (completeness, timeliness and accuracy) and for overall (which is an amalgam of the three data quality criterion). Please see table 2 (overleaf) for events relating to individual animals.

1. Completeness (based on birth registration events with complete data)	1. Sire recording	2. Calving Survey	3. Birth weights	4. Gestation Length	5. Pre-weaning weight	6. Calf docility	7. Calf quality	8. Post weaning weight	9. Linear score.	10. Average
Number of birth registration events.	18	18	18	18	18	18	18	18	18	
Number of these events with data recorded	18	18	0	10	0	18	18	18	18	
% completeness.	100%	100%	0%	50%	0%	100%	100%	100%	100%	72%
2. Timeliness (based on records received within 21 days of event date)	1. Sire recording	2. Calving Survey	3. Birth weights	4. Gestation Length	5. Pre-weaning weight	6. Calf docility	7. Calf quality	8. Post weaning weight	9. Linear score.	10. Average
Number of birth registration events with data recorded.	18	18	0	10	0	18	18	18	18	
Number of these events, where the data was recorded within 21 days	16	16	0	0	0	18	18	18	18	
% on time	88%	88%	0%	0%	0%	100%	100%	100%	100%	64%
3. Normality (based on data presented for genetic evaluations).	1. Sire recording	2. Calving Survey	3. Birth weights	4. Gestation Length	5. Pre-weaning weight	6. Calf docility	7. Calf quality	8. Post weaning weight	9. Linear score.	10. Average
Number of birth registration events with data recorded.										
Number of these events, where the data is outside normality ranges.										
% non normal data										
Under development										
4. Overall score (based on completeness, timeliness & accuracy)	1. Sire recording	2. Calving Survey	3. Birth weights	4. Gestation Length	5. Pre-weaning weight	6. Calf docility	7. Calf quality	8. Post weaning weight	9. Linear score.	10. Average
Calculated as: (0.50 * % complete) + (0.50 * % on time).	94%	94%	0%	25%	0%	100%	100%	100%	100%	68%

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Herd Data Quality Index. Births during 2010/2011

LoCall 1850 600 900

Herd owner Farmer A
Herd designator IE1234567
Print date 01/07/2012
Page 1 of (5)

Table 2. Individual animal data.

This report lists birth registration data, and related events (nine in total) for all cows with a birth event on your farm during 2010/2011. Summary data from table 1 are directly related to data recorded in this table.

Cow Tag	Calf tag	Last insemin			2. Calving	3. Birth	4.	5. Pre-	6. Calf	7. Calf	8. Post	9. Linear
Cow FB	Sex	Birth date			Survey	weight	Gestation	weaning	docility	quality	weaning	score.
Breed	Breed	Wean date	Data quality	1. Sire ID			Length	weight			weight	
123456712346	23456	01/05/2011	1. Completeness.	CF52	1	43		305	G	VG	778	8
345	Male	01/01/2012	2. Timeliness (days)	+4 days	+4 days	+4 days	+4 days	+1 days	+3 days	+3 days	+1 day	+1 days
CH100%	CH100%	01/08/2012	- date of event	1/1/11	1/1/11	1/1/11	1/1/11	1/7/11	1/8/11	1/8/11	1/9/11	1/9/11
				3. Normality	Under development							

Where next?

- Feedback welcome
- Finalise development & design
 - List of most appropriate indicators
 - Yearly report?
- Start development work
- Initially sent out to pedigree breeders
- Target: April 2012

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Predicting live weights

Thierry Pabiou – ICBF
Dairy & Beef industry meeting
14/03/2012

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3 types of analysis

- Prediction of birth weights
- Prediction of post-weaning weights
- Prediction of slaughter weights

Birth weight predictions

Predicting birth weights from
linear measurements taken
at calving

Motivation

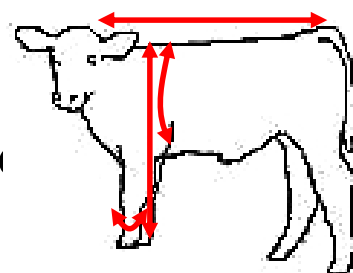
- Give farmer an accurate tool to estimate birth weight
 - Improve the genetic evaluation of birth & growth traits

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Data

- Birth weights and linear measurements recorded on farm
 - 401 records to date => 342 (+ 38) usable
 - 11 extremes
 - 10 DOB incompatibility
 - Linear measures = chest circumference, canon bone circumference, height at shoulder, length of back



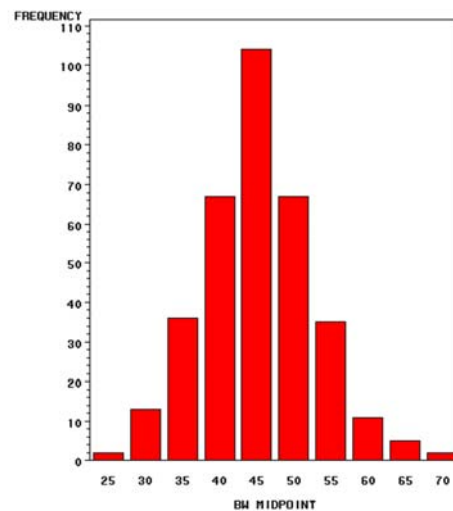
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Some stats

Breed	N	% crossed	% pure
LM	102	82	18
CH	55	62	38
BB	49	100	0
HE	42	29	71
SI	40	57	43
AA	21	43	57
PA	12	75	25
BA	8	100	0
SA	8	0	100
MY	4		
SH	1		
Total	342		

Correlation between linears				
	Chest	Canon	Should.	Length
Chest	1.00			
Canon	0.43	1.00		
Should.	0.58	0.55	1.00	
Length	0.36	0.44	0.44	1.00

Distribution of birth weights



Results using linears only

Model used Birth weight = 1 linear

Chest circ.



Model used Birth weight = 4 linears

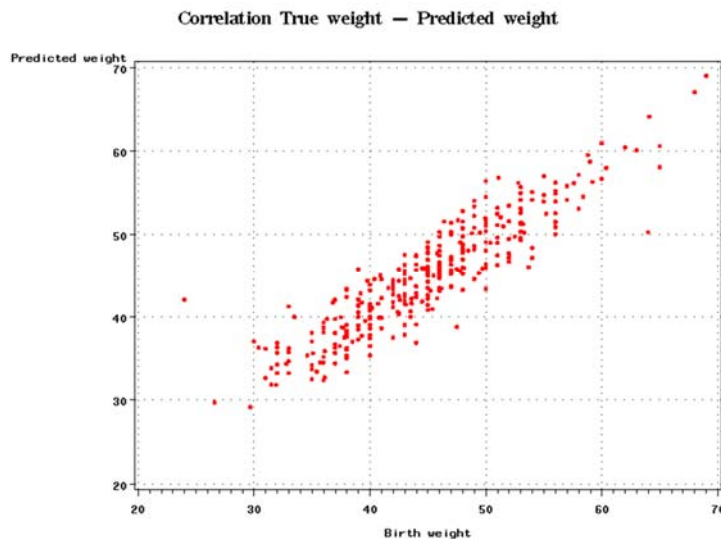
R² = 0.70

Length of back
Canon bone circ.
Height at shoulder
Chest circ.



Best results using more comprehensive models

- $R^2 = 0.82$
- Predictors: Chest Shoulder Canon sex calving_score breed herd
- $R^2 = 0.75$
- Predictors: Chest Shoulder Canon sex calving_score breed herd



Conclusions

- $R^2 \sim 0.70$ using simple model
- $R^2 \sim 0.82$ using more complex models
- Predictors to use: chest & shoulder, canon
- More data ($\sim 500-600$) $\Rightarrow$ calibration/validation

Live weight predictions

Predicting live weights to a
specific age
Or predicting age to a specific
weight

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Motivation

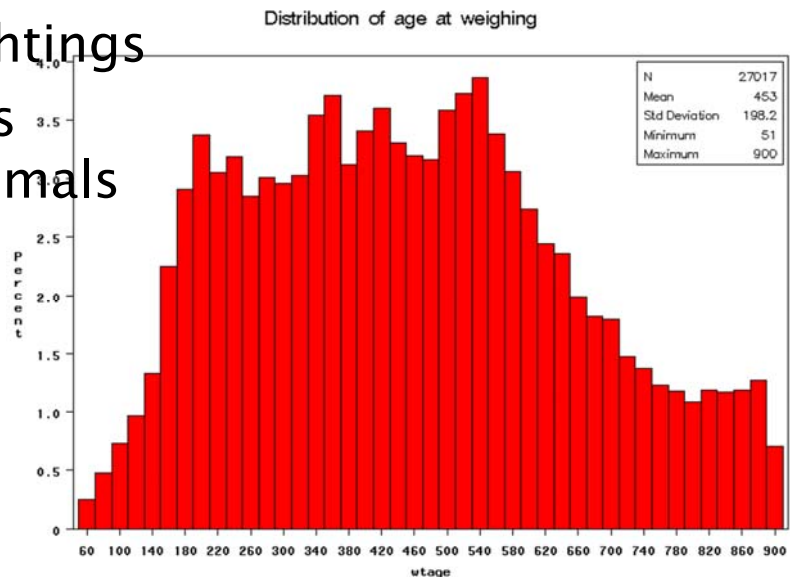
- Provide beef farmer with a new management tool at weighing
 - What is my batch of animals going to weigh in 4 months time?

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Reference population

- To model growth curve from birth to 900days
 - Animals with at least 3 weightings
 - 27,017 weights from 8,568 animals



Model

- Fixed effect
 - Sex (m/f)
 - Sex*age at weighing
 - Herd of weighing
- Random effect
 - Animal
 - Animal *Age at weighing curve

Validation test

- Animals from Better Farm program born after 2008
 - Validation 1 : keep first 2 weights and predict 3rd
 - Validation 2 : keep first 2 weights and predict weight taken after 550 days of age

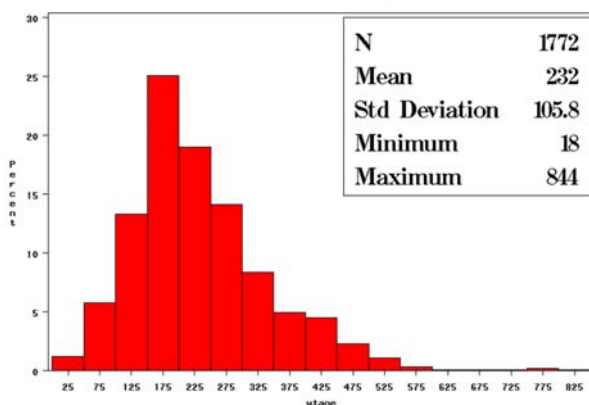
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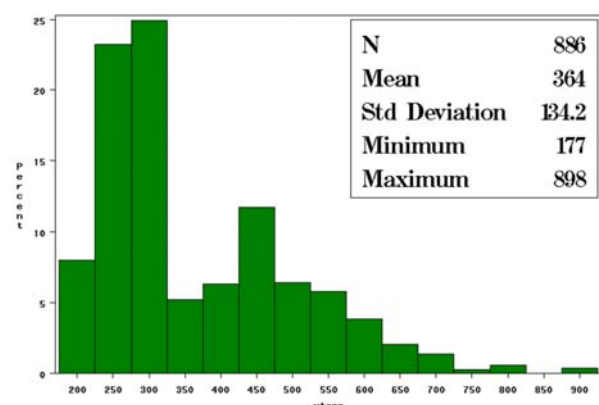
Validation 1

- Predicting 3rd weight using first 2 weights

Predictor weights



Predicted weights

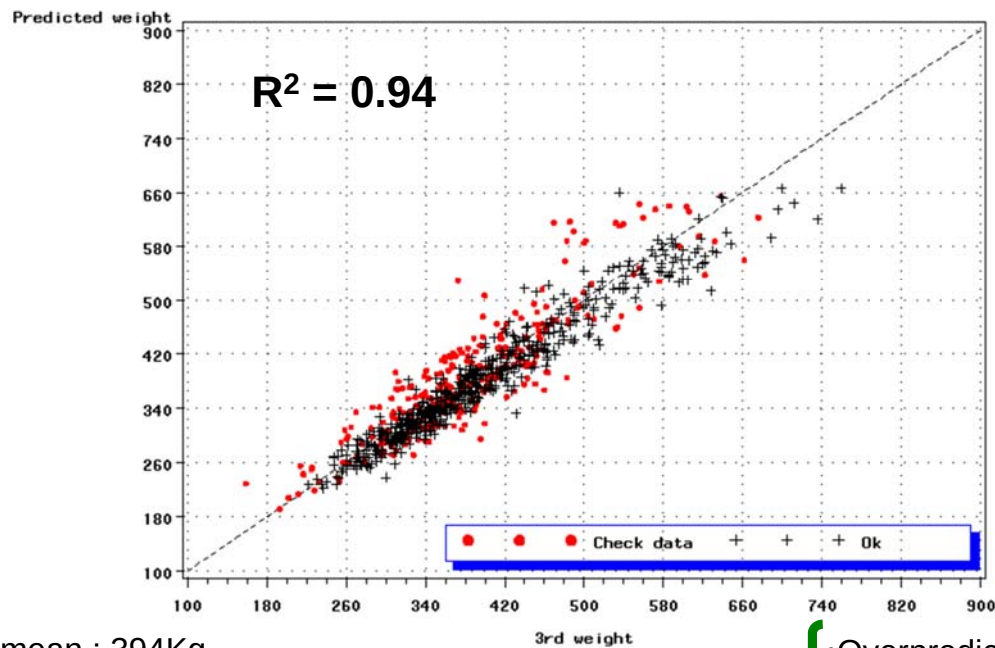


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Validation 1

Correlation True weight — Predicted weight
2 weight(s) to predict 3



• True mean : 394Kg

• Predicted mean : 380Kg

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95% data

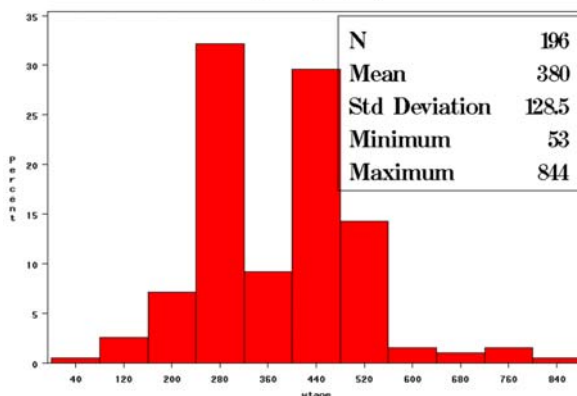
• Overprediction ~20Kg

• Underprediction ~50Kg

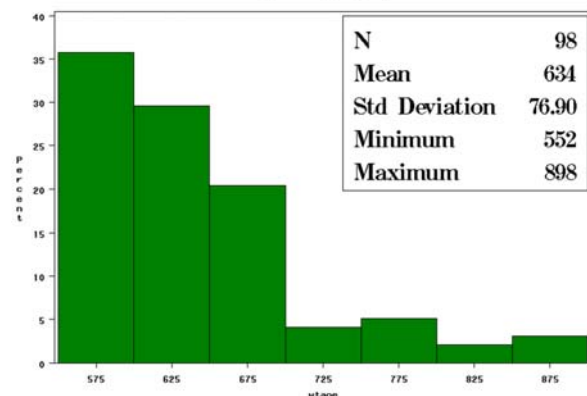
Validation 2

- Predicting 3rd weight taken after 550 days using first 2 weights

Predictor weights

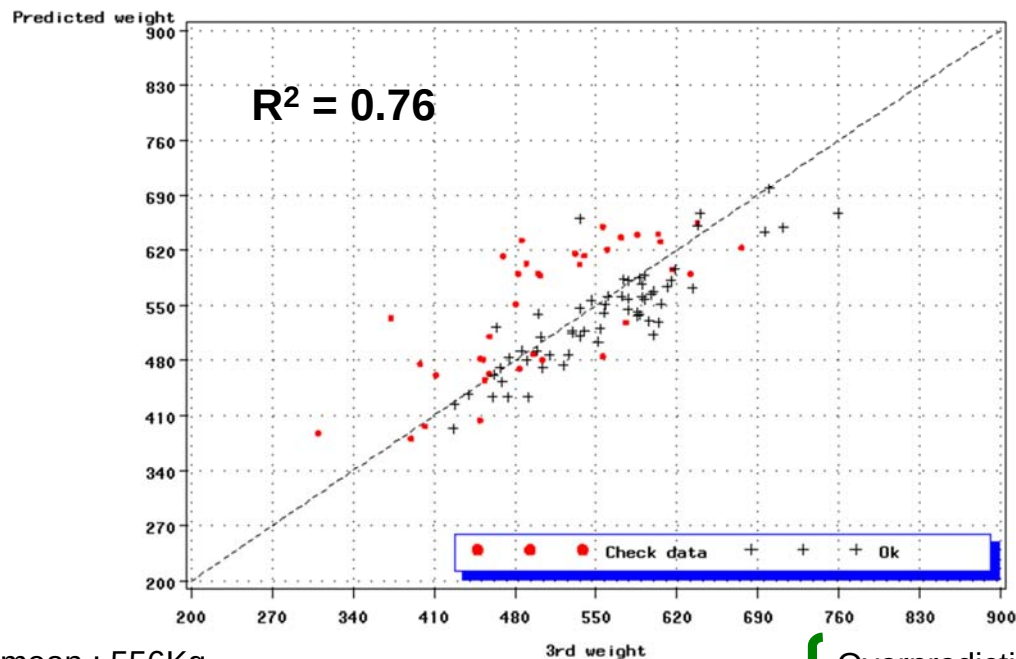


Predicted weights



Validation 2

Correlation True weight — Predicted weight
2 weight(s) to predict 3



• True mean : 556Kg

• Predicted mean : 536Kg

• Overprediction ~26Kg

• Underprediction ~66Kg

Conclusions

- On-going research
- Need to refine prediction at later age
=> model
- Need more weights at +600days
- Need to work on a confidence interval
for prediction

Live weight at slaughter predictions

Predicting live weights at slaughter

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Motivation

- Provide beef farmer with a new management tool in slaughter reports
 - What was the kill-out of my animals?

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Data

- Weight file and slaughter file
- Predictors used : CCW CCON CFAT Live weights
- Predicted values: Live weight at slaughter (within 2 days before slaughter)

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Models

Label	Model	Specifics
BasePlus	$Y = \text{CCON} * \text{type}$ $\text{CFAT} * \text{type}$ $\text{CCW} * \text{type}$	Calibration/Validation sampled 200 times ; final parameters = average of 200 estimates
LiveWT	$Y = \text{CCON} * \text{type}$ $\text{CFAT} * \text{type}$ $\text{CCW} * \text{type}$ $\text{LWT} * \text{diffage}$	Same as BasePlus. LWT = last live weight recorded (up to 2 days prior to slaughter) Diffage = number of days between LWT and slaughter date

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Validation / Results

Label	N	Heifers	Steers	YBulls	Calibration	Validation
BasePlus	19,458	7,267	11,055	1,136	16,458	3,000
LiveWT	4,781	1,326	3,092	363	3,781	1,000

	BasePlus	LiveWT
R^2	0.905	0.931
RMSE	28.72	23.68
Bias	0.0212	0.0319
r_e	0.0006	0.0011

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Over / Under-prediction

Residuals = True weight – Predicted weight		
Quantiles	BasePlus	LiveWT
100% Max	122	122
99%	61	57
95%	40	39
90%	31	30
75% Q3	16	15
50%	0	-1
25% Q1	-15	-15
10%	-29	-29
5%	-37	-38
1%	-60	-57
0% Min	-211	-200

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Conclusions

- Implementation of the 2 sets of equations depending if animals has live weights or not
- Need to work on a confidence interval for prediction

***“On-farm” Weight
Recording Service.***

Background.

- ICBF currently provides an “on-farm” weight recording service (~20k recs/year).
 - Pedigree herds.
 - GENÉ IRELAND progeny test herds.
 - “Industry-good” initiatives, e.g., Teagasc/IFJ BETTER farms program, ABP/Kepak/IFJ Dairy2Beef.
- ICBF are keen to expand level of “on-farm” weight recording.
 - Suckler farms - calves on cows (maternal milk).
 - Growing/finishing farms (terminal traits).

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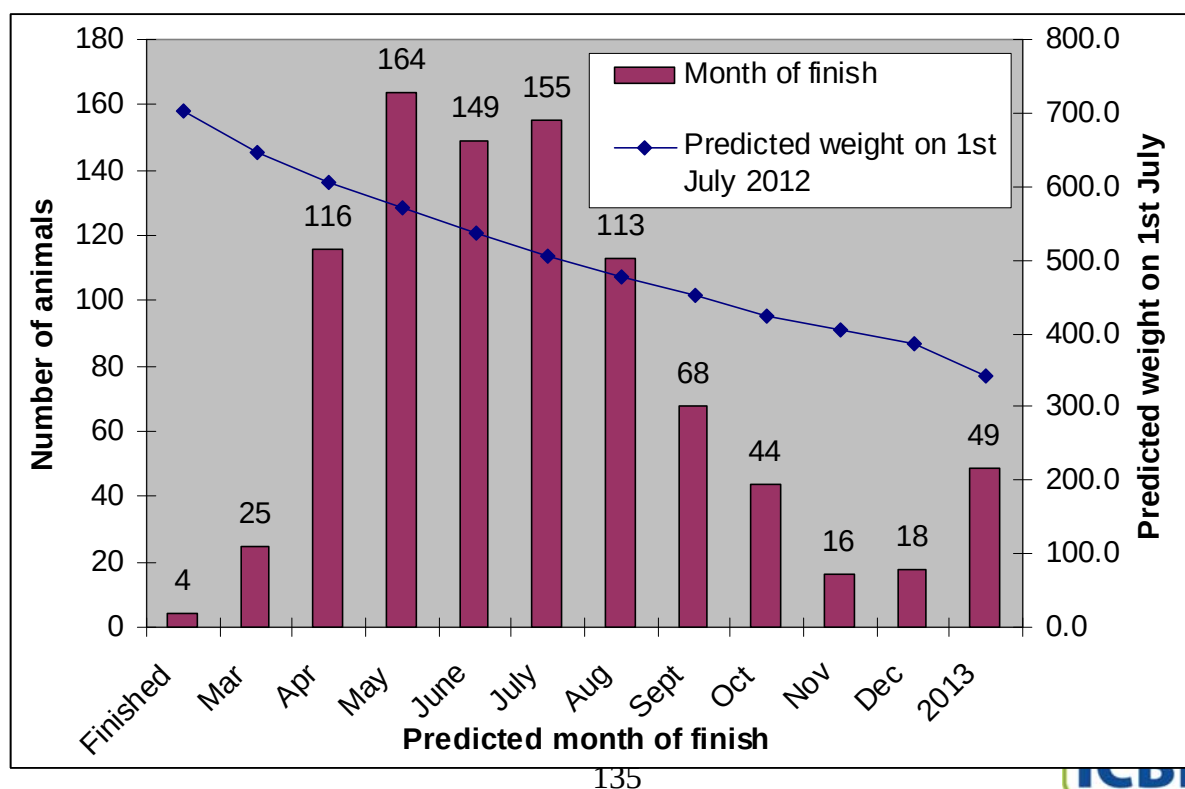
Example: ABP/Kepak/IFJ Dairy Calf to Beef Project.

- Holstein-Friesian male calves.
- Target to have bulls finished at 520 kg, ~ 16 months, ~ 1st July 2012, 200 day finishing period.
 - Weaning weight ~ 100kg
 - Housing weight ~ 270kg
 - Yearling weight ~ 360 kg.
 - Finishing weight ~ 520 kg.
- ICBF providing weight recording service.
 - 16 herds, ~1000 animals & 3 weights.

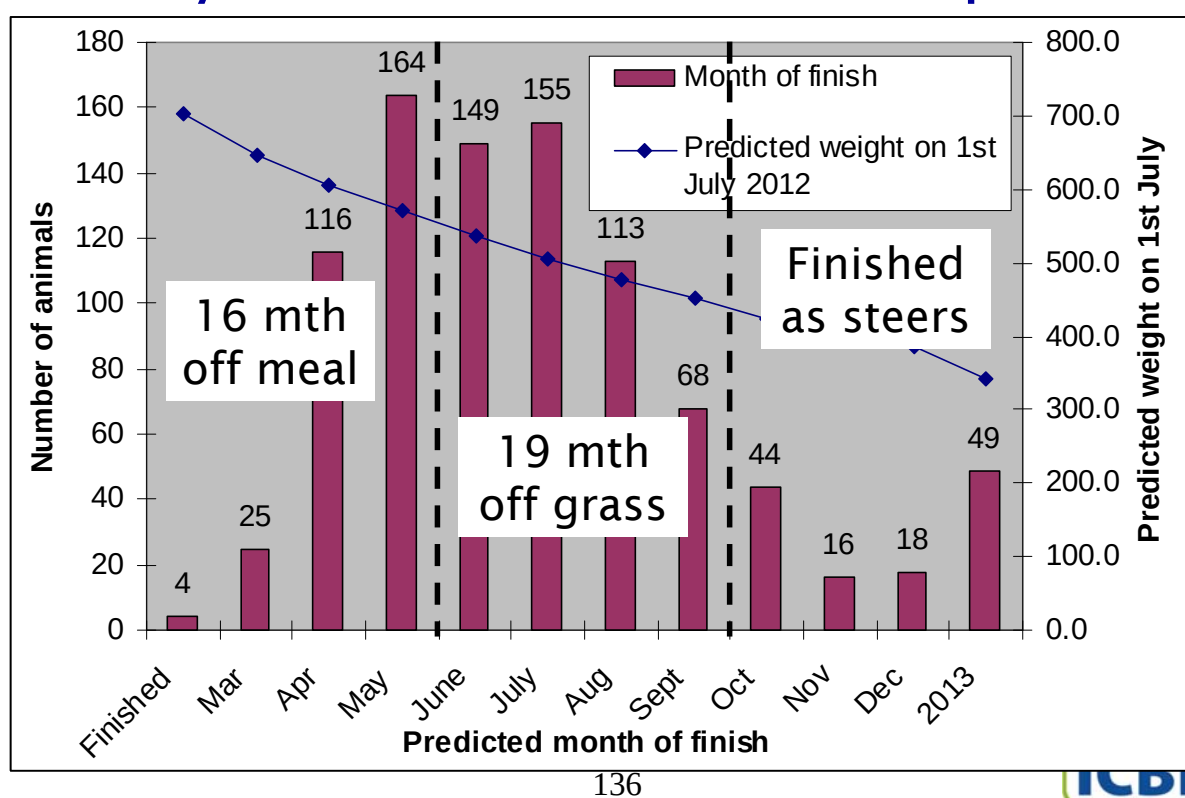
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Using weight data to establish when the animal will reach 520kg live-wt (ii)



Using weight data to “assign” animals to systems – and maximise profit.



“New” Weight Recording Service (i)

- Must support BTAP program, Teagasc BETTER farm herds, industry good initiatives & pedigree/commercial herds keen to undertake multiple weighings.
- Pilot projects underway;
 - Castleisland FRS, ABP Monaghan & Bandon discussion group.
- Full testing of systems.
 - Data collection -> database -> weight predictions -> reports.

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“New” Weight Recording Service (ii)

- Plan to have operational by 1st July.
 - National coverage (to support demand).
 - Initially focused on technician service (based on handheld. No DIY model yet).
- Operate directly from ICBF database.
 - Scheduling, data downloads, data uploads, reports....
- Local contractors operating within areas.
- Will also support existing systems on farms (Trustest, Gallagher, farm PC's)

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Genomic selection in beef

Donagh Berry

Teagasc, Moorepark

Irish Cattle Breeding Federation Industry Consultation Meeting, March 2012



The Irish Agriculture and Food Development Authority

Beef ≠ Dairy

Less use of AI in beef

Smaller population size per breed

Lots of crossbreeding

Lower reliability of phenotypes

Across breed genomic evaluation



The Irish Agriculture and Food Development Authority

First step

- **Within-breed genomic evaluations across multiple breeds**

Irish Cattle Breeding Federation genetic evaluations

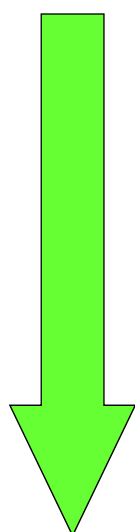
- **Estimated breeding values & reliability**
- **Carcass traits**

Genotypes - Illumina HD (777,962 SNPs)

Breed	Genotypes
Angus	236
Charolais	587
Hereford	215
Limousin	559
Simmental	237
Total	1,834

SNP editing

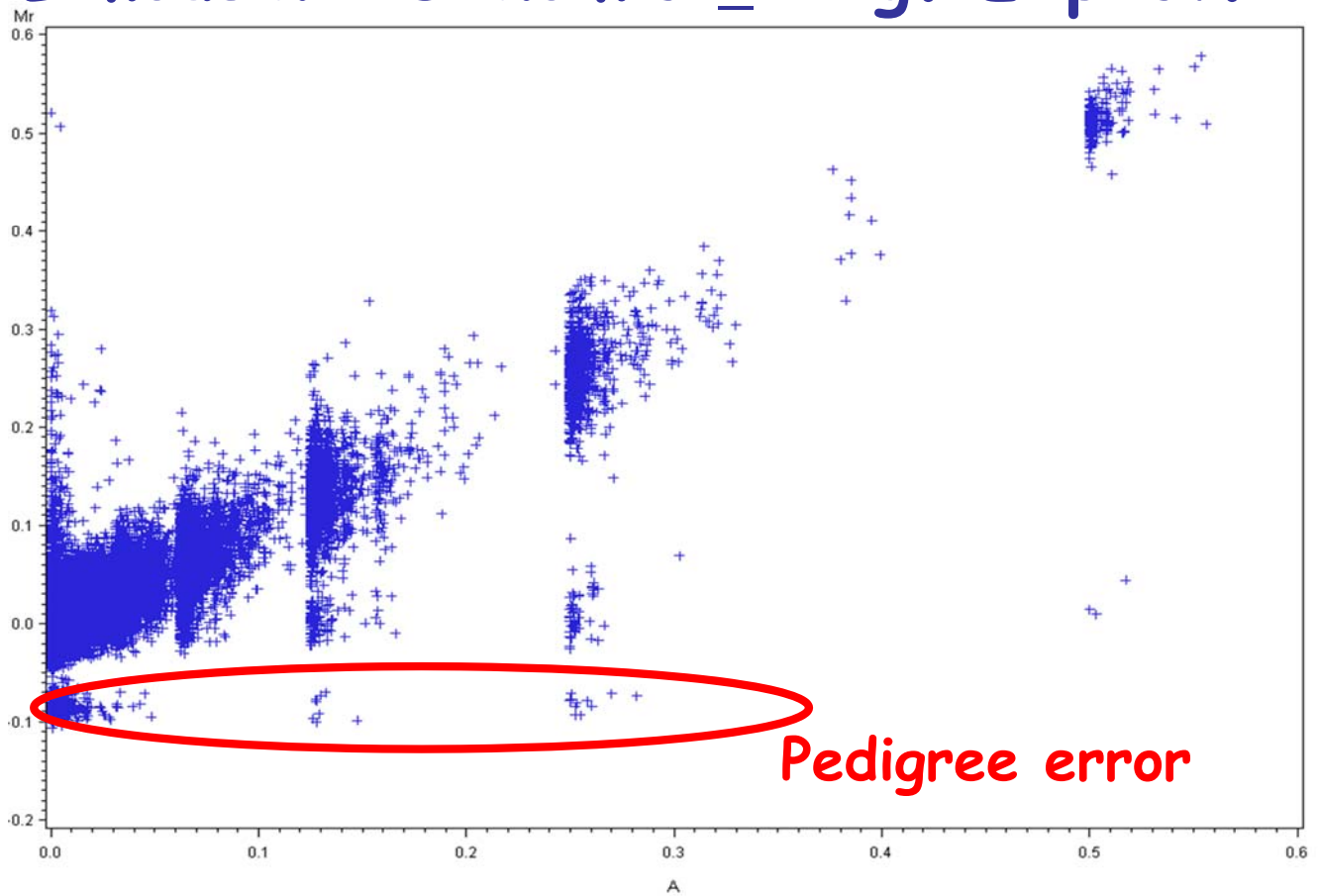
SNPchip 777,962



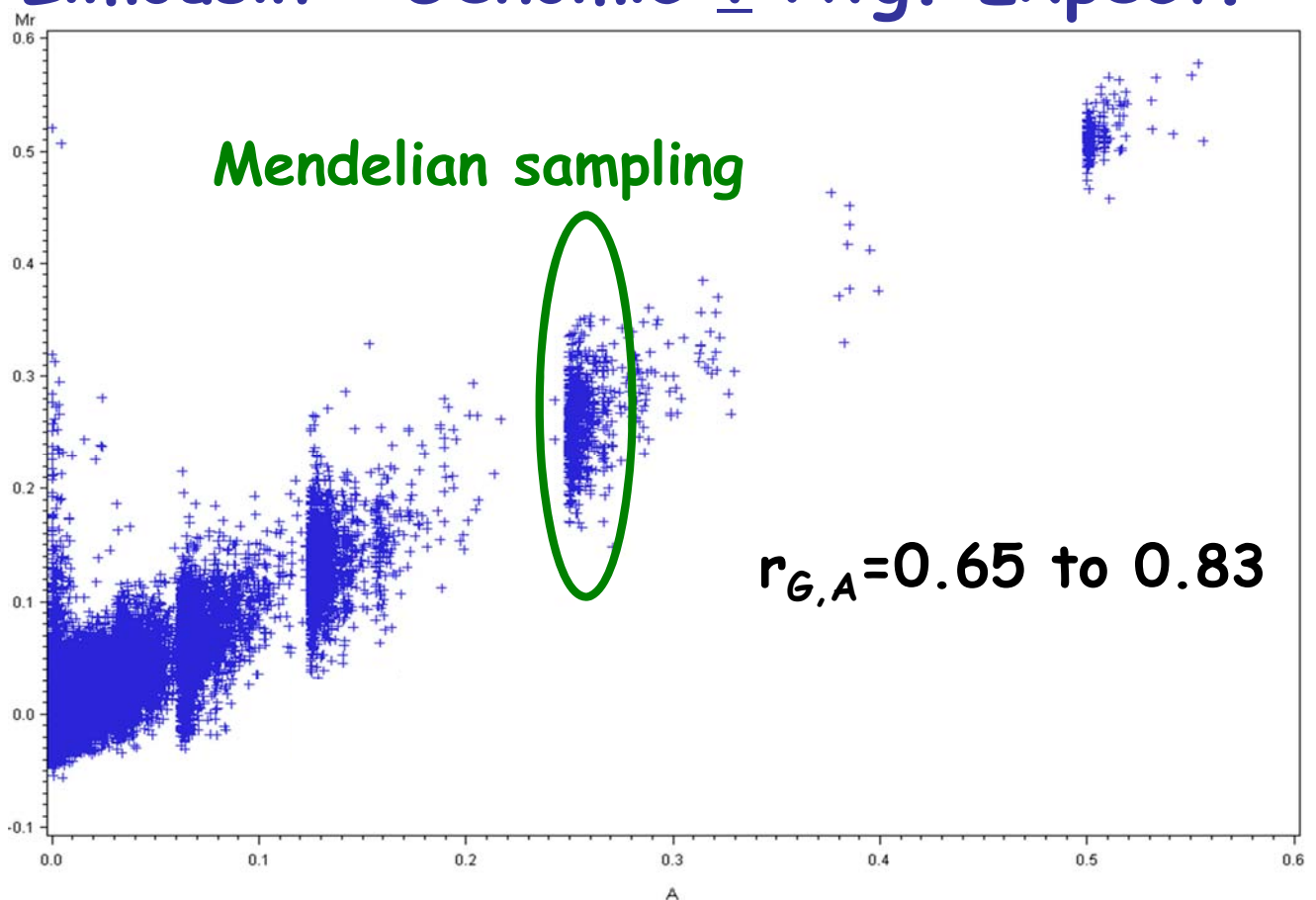
X/Y/MT SNPs
Poor clustering
Lack Mendel. Consist.
Call rate <95%
Monomorphic
Low MAF
Hardy-Weinberg
Hetero. no homo.

Analysis 561,800

Limousin - Genomic ν Avg. Expect.



Limousin - Genomic ν Avg. Expect.



Mean (SD) influence of genomics

Breed	Calib.	Valid.	Genomic reliability	Weighting genomics
AA	156	65	0.13 (0.11)	0.06 (0.05)
CH	398	147	0.19 (0.10)	0.08 (0.05)
HE	128	57	0.16 (0.15)	0.04 (0.09)
LM	412	102	0.18 (0.09)	0.08 (0.04)
SI	167	66	0.27 (0.18)	0.14 (0.17)



The Irish Agriculture and Food Development Authority

Accuracy

Brd	Trait	r	Bias
CH	Weight (kg)	0.44	5.21
	Conformation (scale 1 - 15)	0.39	0.37
	Fat (scale 1 to 15)	0.66	0.14
LM	Weight (kg)	0.47	5.96
	Conformation (scale 1 - 15)	0.31	0.63
	Fat (scale 1 to 15)	0.32	0.14



The Irish Agriculture and Food Development Authority

Conclusions

Not enough genotypes + phenotypes for successful within breed genomic selection

- More genotypes
- Across-breed genomic predictions
 - Including dairy



The Irish Agriculture and Food Development Authority

From microsatellites to SNPs

Donagh Berry

Teagasc, Moorepark

Irish Cattle Breeding Federation Industry Consultation Meeting, March 2012



The Irish Agriculture and Food Development Authority

Microsatellites

- Repeating segments of DNA (2-6 bases)
- ACACACACAC v ACACAC

SNP

- Single base change (tiny change)
- ACAGTTA v ACGGTTA

Pro's and con's

Microsatellites

- Highly polymorphic
- Relatively low frequency (1 per 15kb)
- Poor multiplexing
- **Cannot** be used in genomic selection

SNPs

- Mostly biallelic
- Higher frequency (1 per ~1kb)
- Good multiplexing
- Amenable to automation → cost
- **Can be used in genomic selection**

Microsatellites $\neq$ SNPs

Old

$\neq$

new

Have some prominent animals
genotyped on HD chip



The Irish Agriculture and Food Development Authority

The solution

ACAGCTATTGTACAGAGAGAGAGCTGCCCTAGTAC
TCACCTATTCTACAGAGAGAG CTGCCGTATTAG

- “Tag” the microsatellites with SNPs in the vicinity
- Working with USDA (and Weatherbys) on dairy & beef cross reference



The Irish Agriculture and Food Development Authority

Beef economic values

Irish Cattle Breeding Federation Industry Consultation Meeting, March 2012



The Irish Agriculture and Food Development Authority

Why change?

Current economic values based on separate profit functions

Complete bioeconomic model used in dairying

- Better account of entire system such as feed budget

New traits – docility, disbudding, AA & HE premium



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Base model

Farm area (ha)	40.0
Cows calving	65.6
Farm stocking rate (organic N/ha)	210
Replacement rate (%)	20%
Weaning weight – mean of heifers and steers (kg)	317
Carcass weight – mean of heifers and steers (kg)	371
Mature cow weight (kg)	601
Percentage grass	61%
Percentage silage	32%
Percentage concentrate	7%
Mean annual R3 steer price (€/kg)	3.59 (3.78)
Replacement heifer price (€/head)	1696 (2096)
Gross margin per cow calving (€)	470



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Preliminary economic values

Trait	Current	Modelled
Gestation length (€/day)	-2.12	-1.5
Direct weaning weight (€/kg live)	1.8	
Direct carcass weight (€/kg carcass)	3.2	3.78
Progeny intake (€/kg DM)	-0.13	-0.14
Survival (€/ % decrease)	2.94	
Calving interval (€/day)	-1.37	-2.52
Age at first calving (€/day)	-0.1	-1.36
Maternal weaning weight (€/kg live)	1.8	1.38
Cow weight - intake (€/kg DM)	-0.41	
Cow weight - cull value (€/kg live)	2.8	1.49
Direct calving difficulty (€/ % change)	-2.96	-5.27
Maternal calving difficulty (€/ % change)	-1.81	-2.15



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New traits - 1

Docility

- Labour, injury (*time off work + medical costs*) & death
- Cows and weanlings separately
- Risk changes by 15% per unit change in docility score
- Suckler cow: €34.40/score
- Weanling: €18.40/score



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New traits - 2

Disbudding

- Costs: check in growth, death, anaesthetic, labour, depreciation cost of equipment
- Weighted between farm relief (60%) and farmer themselves (40%)

Remember disbudding is ~100% heritable (will be 100% heritable soon)

€7.95 for polledness



The Irish Agriculture and Food Development Authority

New traits - 3

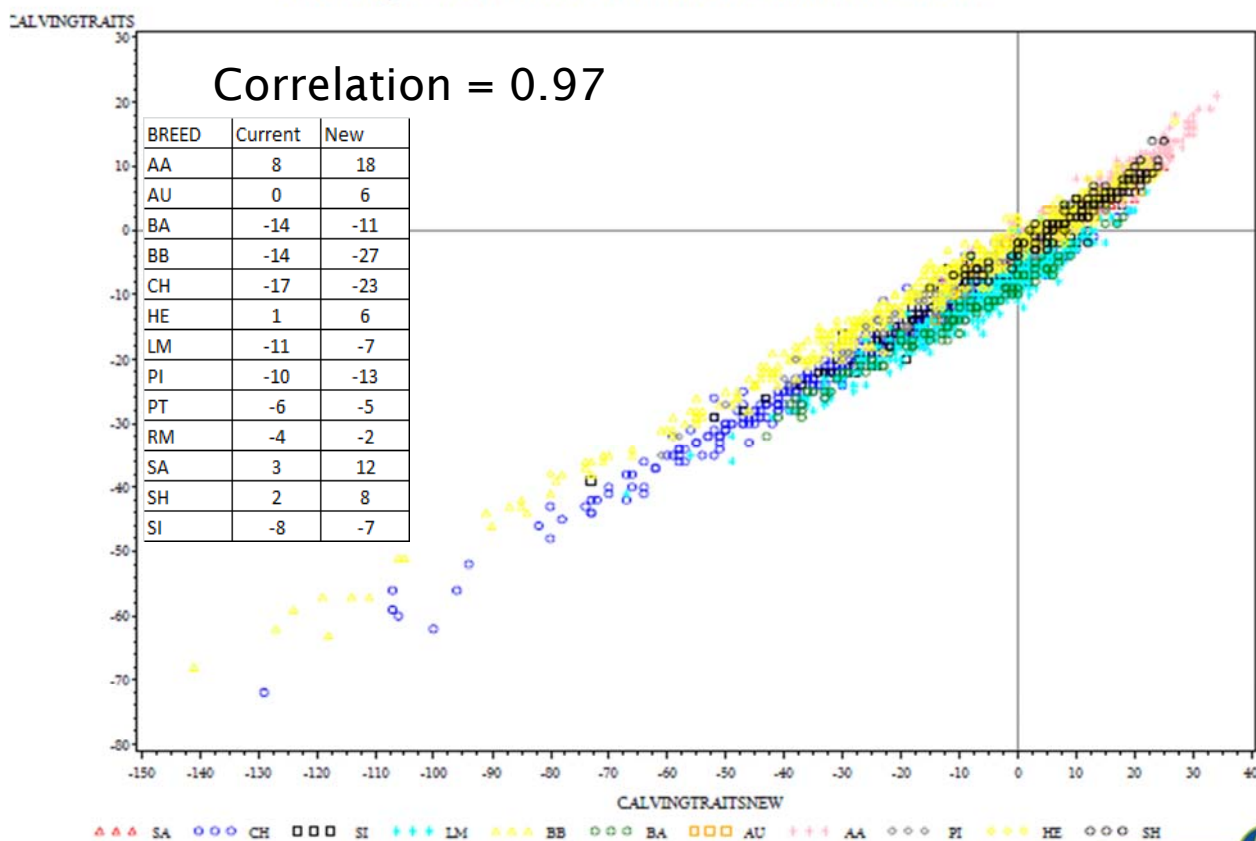
AA & HE premium

- ~400,000 AA and HE calves
- ~40,000 receive a premium
 - **20 cents/kg carcass * 330 kg**
- On average 0.02 cents/kg

€6.60 added to beef carcass value of AA and HE sires

Impact on bull proofs

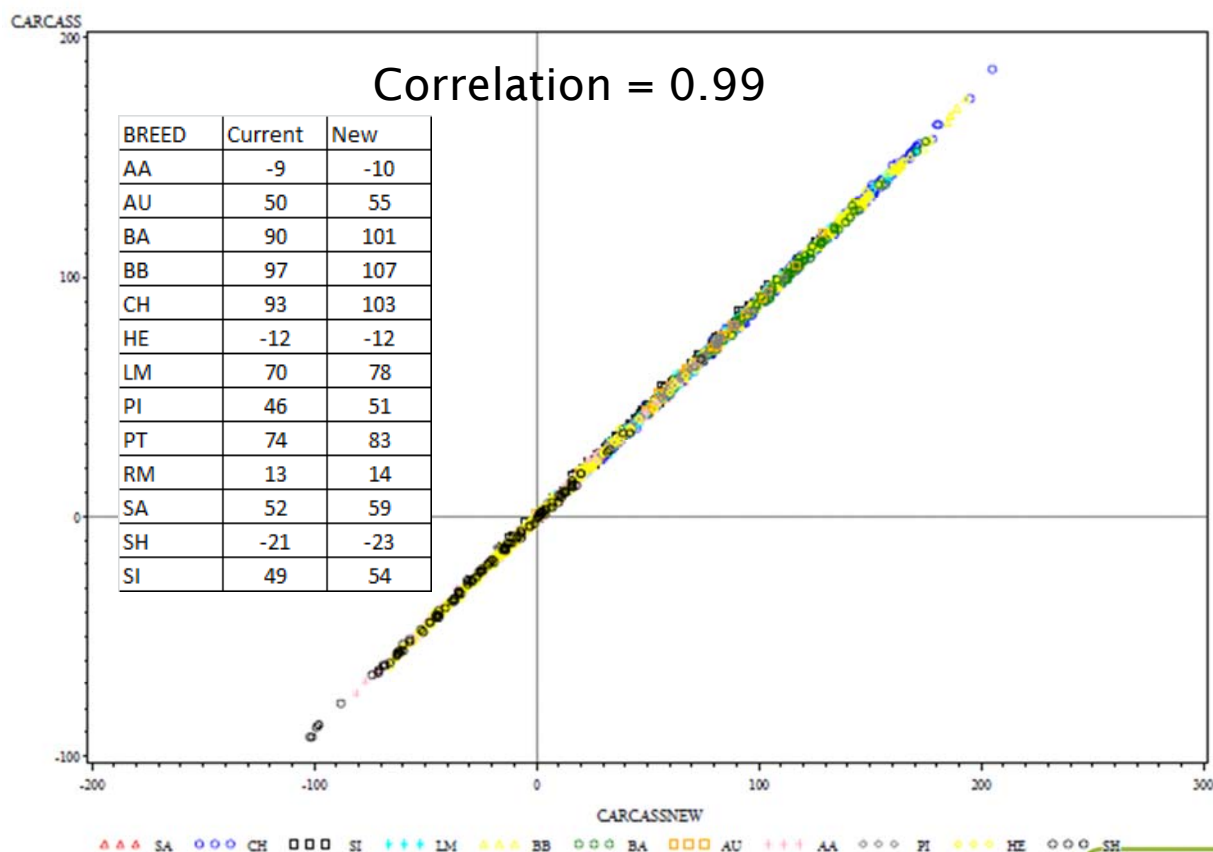
Calving traits index current vs with new EWs



163



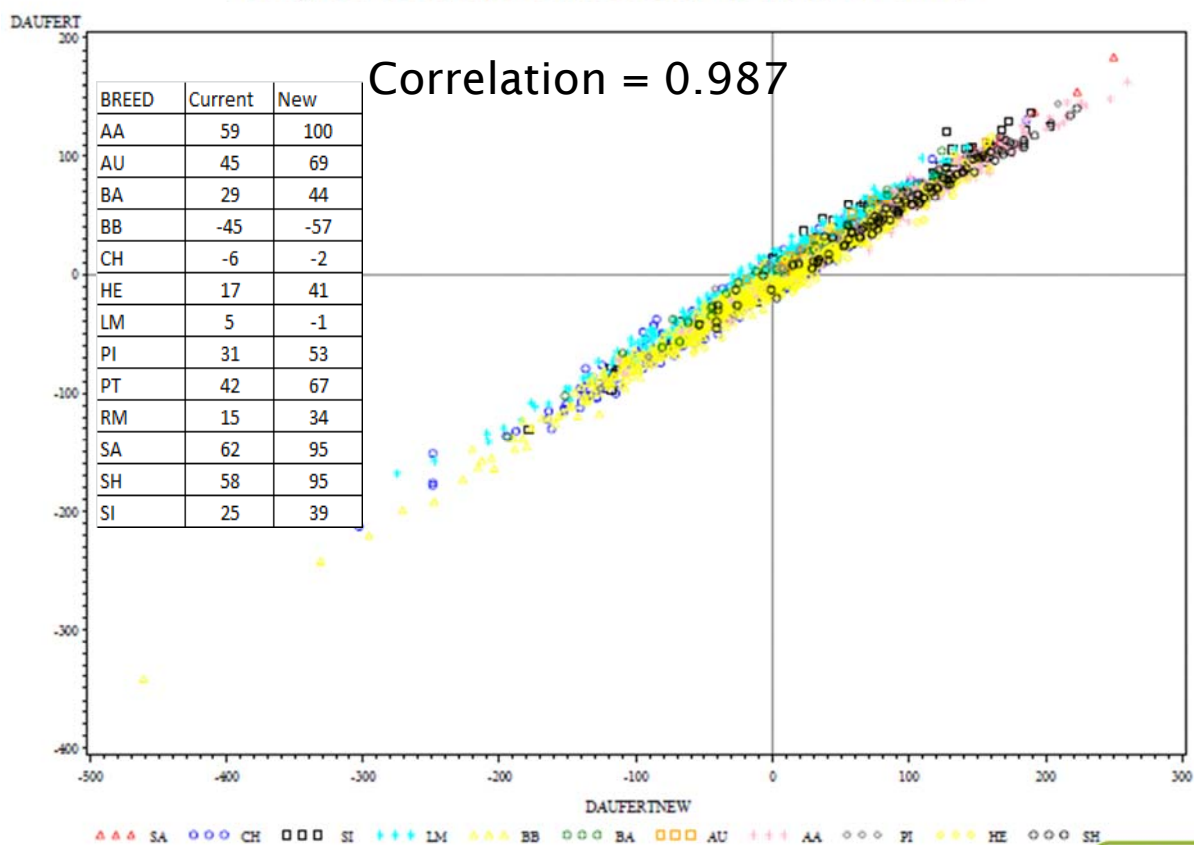
Beef Carcass index current vs with new EWs



164



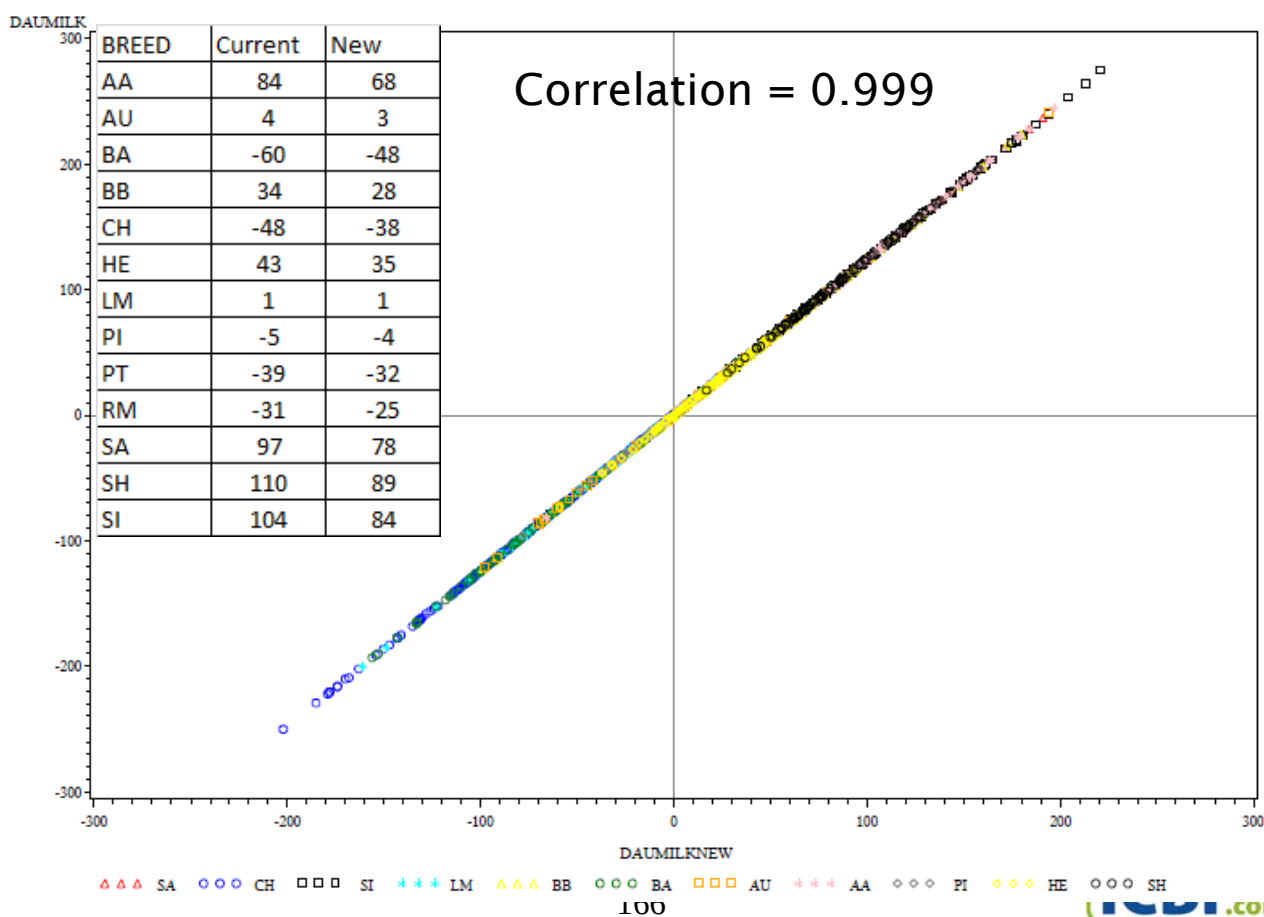
Daughter Fertility index current vs with new EWs



165



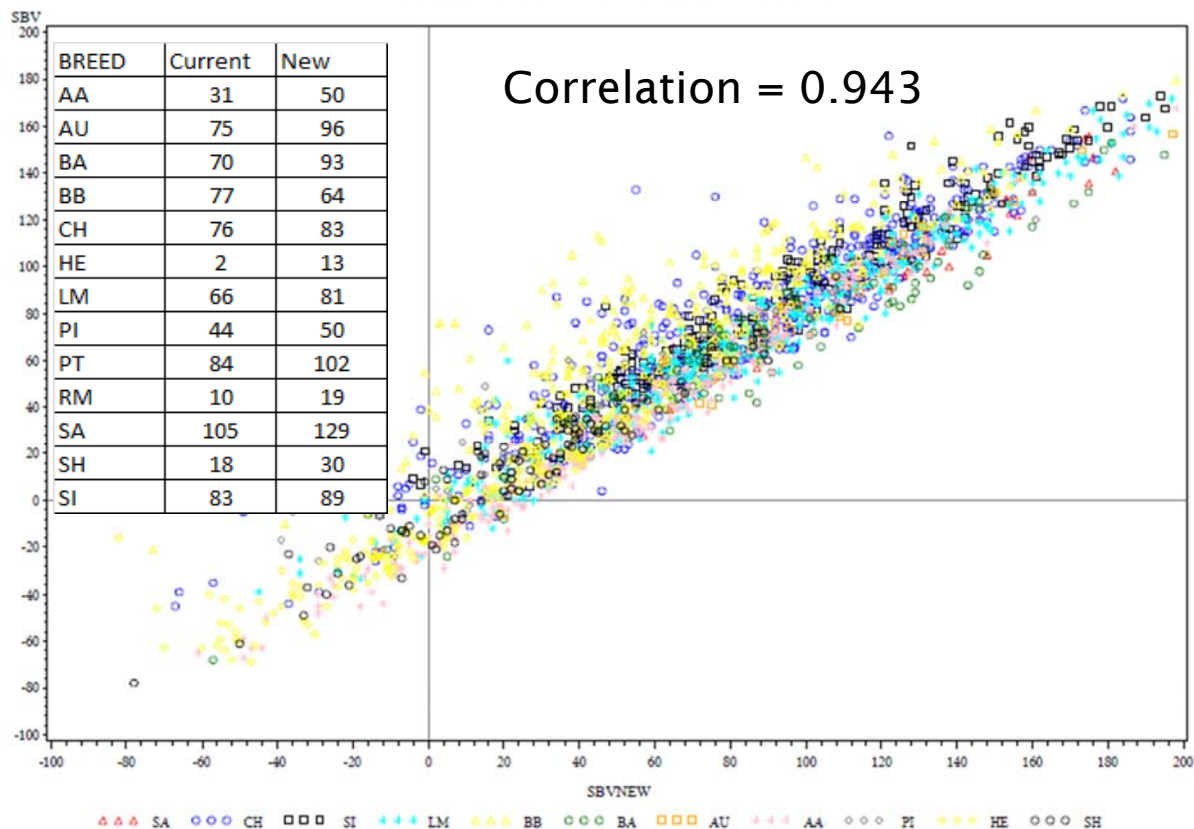
Daughter Milk index current vs with new EWs



100



SBV current vs SBV new EWs



167



Conclusions

Work in progress

Economic values are not changing much between the two approaches

Main issue is how to present



IRISH CATTLE BREEDING FEDERATION

€uro-Star Review.

14th March 2012.



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Terms of reference.

- “To advise on the further development of information services (€uro-Stars) provided by ICBF to support the breeding or more profitable beef cattle in Ireland”.
 - Not to get into “detail” re: technical issues, e.g., traits, bulls etc.



Work plan.

- Three main work areas; indexes, presentation & strategy.
- Anticipate 4-5 meetings.
- Submit report to ICBF board in May 2012.
- Implement changes in August 2012.

Key Questions?

- What are the main categories of farmers that need information for breeding decisions, e.g., farmer breeding replacements, farmer breeding for terminal use etc? Does this differ depending on whether pedigree beef, commercial beef or dairy farmer?
- What information do they need, e.g., which indexes &/or sub-indexes, which traits, what other information would be useful?
- How should this information be presented?
- Can we develop a coherent industry strategy to support their breeding needs? What are the key elements of this strategy?

Industry submissions.

- Submission received from 10 beef industry stakeholders.
 - (i) BETTER farms, (ii) Irish Farmers Association, (iii) Irish Aberdeen Angus Association, (iv) Irish Angus Cattle Society, (v) Irish Blonde d'Aquitaine, (vi) Irish Charolais, (vii) Irish Hereford, (viii) Irish Limousin and (ix) Salars Cattle Society & (x) Dovea Genetics.
- Very positive piece of work. Excellent pointers for review group.

	1. Categories - What categories of farmers are we catering for?	2. Content - What information do farmers need (currently missing)?	3. Presentation. How should it be presented?	4. Uptake. Elements to promote uptake?
1. BETTER farms	Beef farmers, especially those breeding/selecting maternal replacements.	Maternal. Fertility & survival are main traits. Also docility. Index for females. Data reliability.	Terminal & maternal. Stars half shaded. Drop /move ranking (confused with data rel)	Search facility. Boards in marts. ICBF weighing service.
2. Irish Farmers Association.	Selecting and/or breeding maternal replacements.	Maternal. Easy calving, fertility, milk, docility, age at first calving & low maintenance.	Terminal, maternal and/or overall.	On farm reports and/or information at marts.
3. Irish Aberdeen Angus Association		Cost of production traits, notably; survival, ease of calving, age 1st calving, docility, polledness, age at slaughter & meat eating quality.		Name of sire on calf passport
4. Irish Angus Cattle Society	Dairy farmer not catered for.	Calving, gestation, lower costs & meat eating quality		
5. Irish Blonde Cattle Society.	Suckler, pedigree & dairy.	Maternal = milk, weight, muscle, calving and fertility. Terminal = weight, muscle & calving. Functionality (for pedigree breeders).	Terminal & maternal. Mean of 100 & SD of 10.	
6. Irish Charolais Cattle Society.	Beef (weanling, finishing &/or breeding replacements) & dairy. Specialisation in future.	Maternal traits (currently contained in SBV but with higher weighting in future). Data reliability cut-offs.	Terminal & maternal. Stars but increased breakdown (10 percentiles). Move % rank.	
7. Irish Hereford Cattle Society.	Beef & dairy.	Cost of production traits notably; calving, vet & docility. Meat eating quality premium. Data reliability.	Terminal, maternal, dairy.	
8. Irish Limousin Cattle Society.	All farmers	Terminal (export, carcass, calving ease/survival & feed efficiency). Maternal (milk, fertility, calving ease & cow efficiency). Overall (terminal + maternal).	Terminal, maternal & overall. Stars with additional key traits. Data quality index. Data reliability prominent. Traffic light approach. Within breed on catalogues, within & across on web. Increased spread for some traits, e.g., calving.	Weight recording initiative (birth, ~150 day & ~250 day)
9. Salar cattle society.	Farmers with different levels of understanding.	Terminal (calving, growth, weanling & beef carcass), maternal (milk, fertility, gestation length), docility.	Terminal & maternal.	
10. Dovea Genetics.	Beef farmers, looking for terminal &/or maternal traits. Some requirements for dairy farmers.	Terminal (weanling & beef carcass) & maternal (milk & fertility). Additional key traits are docility and calving difficulty. Should also consider including calving difficulty directly within these indexes.	Terminal & maternal. No desire for an overall index. Need a simplified sales catalogue. Low data reliability needs to be addressed. Reasses stars to highlight top 1 & 5% bulls.	Strategy needs to support all sectors. No real difference between pedigree and commercial requirements. Important to get correct wording for "dairy beef index".

Next meeting.

- Index work being finalised.
- Moving to presentation of material, including industry strategy.
- Confident of finishing work by May 2012.
- Implementation by August 2012.