IRISH CATTLE BREEDING FEDERATION

Herdbook technical meeting

Killeshin Hotel, Portlaoise.
1st November 2011.

National Development Plan
Transforming Ireland

Agenda.

- Maternal weaning weight – Ross.
  - Update on female fertility.
- Calving difficulty – Francis.
- Data reliability - Andrew
- Other projects - Andrew
- AOB.

Maternal weaning weight evaluation

Changes since August meeting

- Reduced genetic correlation between direct and maternal weaning
- Predictor traits
  - Inclusion of Linear type Muscle composite and carcass traits with a mild negative correlation with muscle, weight and conformation and mild positive with carcass fat
  - Dairy herd milk yield, fat and protein yield as predictors for dairy cows and SI and SH
  - Reforming of breed groups: now 5 year groups
  - Splitting up of heterosis into beef x beef and beef x dairy

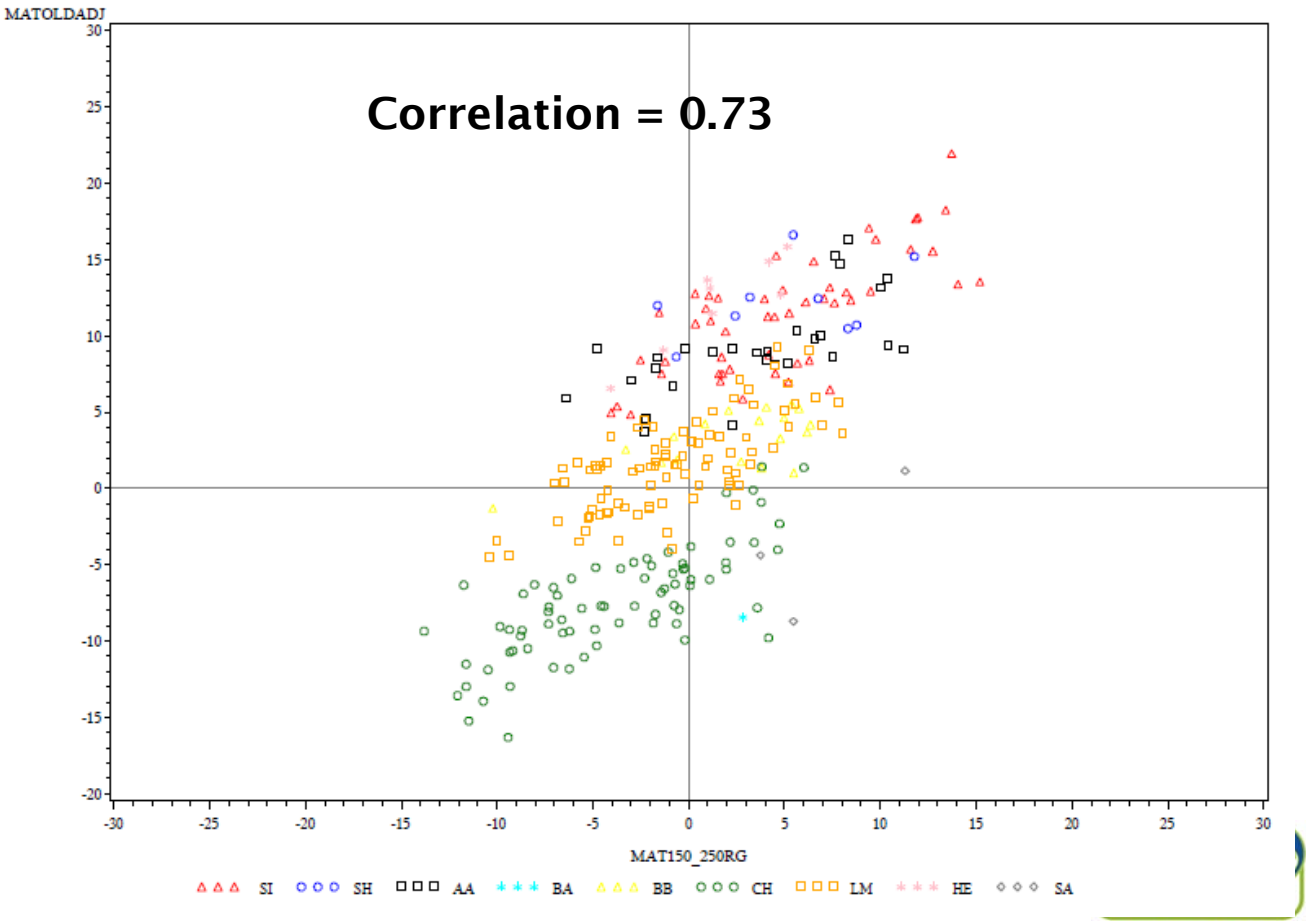
Correlations with other traits

Possible predictor Trait	*Current Milk pd*	*NEW Test Milk pd*
Weaning weight	-0.10	-0.15
Carcass weight	-0.57	-0.43
Carcass conformation	-0.49	-0.33
Carcass fat	0.51	0.35
Skeletal Composite	0.03	-0.06
Muscle Composite	-0.03	-0.22
Development of hind Quarter	-0.32	-0.24
Loin Development	-0.37	-0.36
Current Milk index		0.71

New data since August (with mgs)

TRAIT	Aug-11	Oct-11	Extra
age 50-150	27,514	29,508	1,994
age 150-250	104,344	133,355	29,011
age 250-350	114,323	138,618	24,295
age 350-450	73,539	88,000	14,461
age 450-550	22,551	30,310	7,759
age 550-700	34,230	45,499	11,269
Total	376,501	465,290	

7: old adjusted (official) v new 150-250 with rg, 70% rel old:



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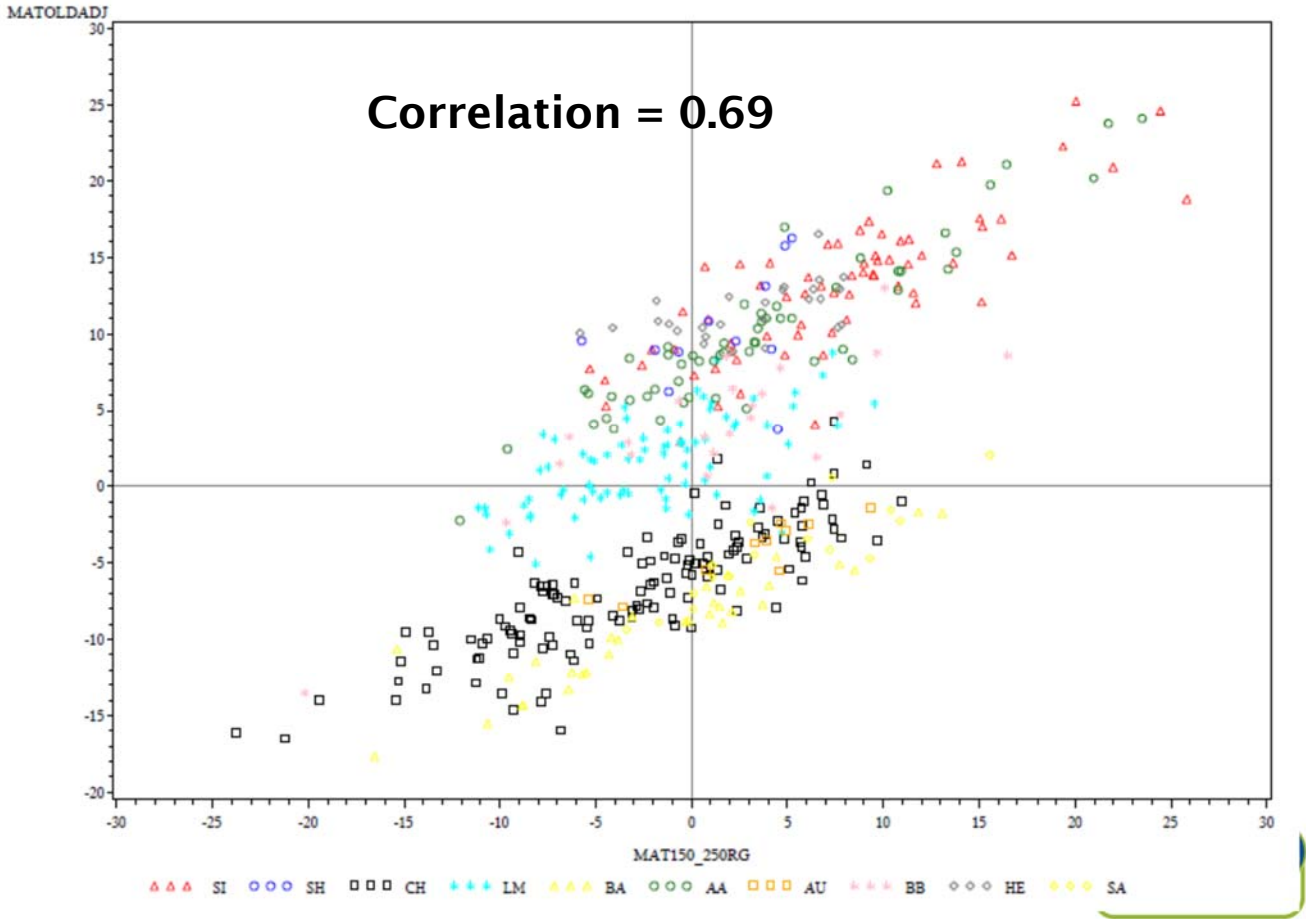
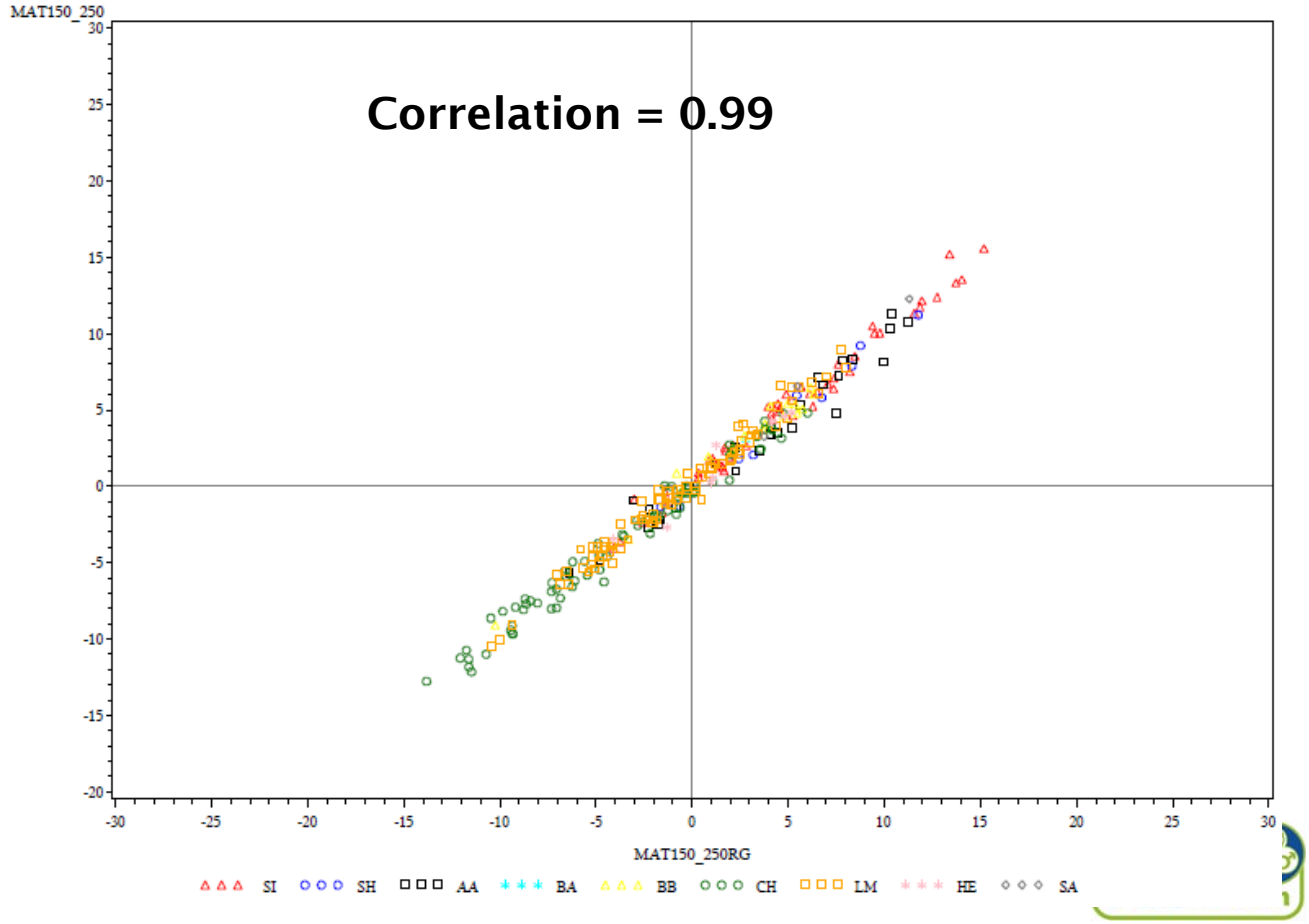
7: old adjusted (official) v new 150-250 with rg, 45-70% rel old:



5: new 150-250 v new 150-250 with rgs, 70% rel old:



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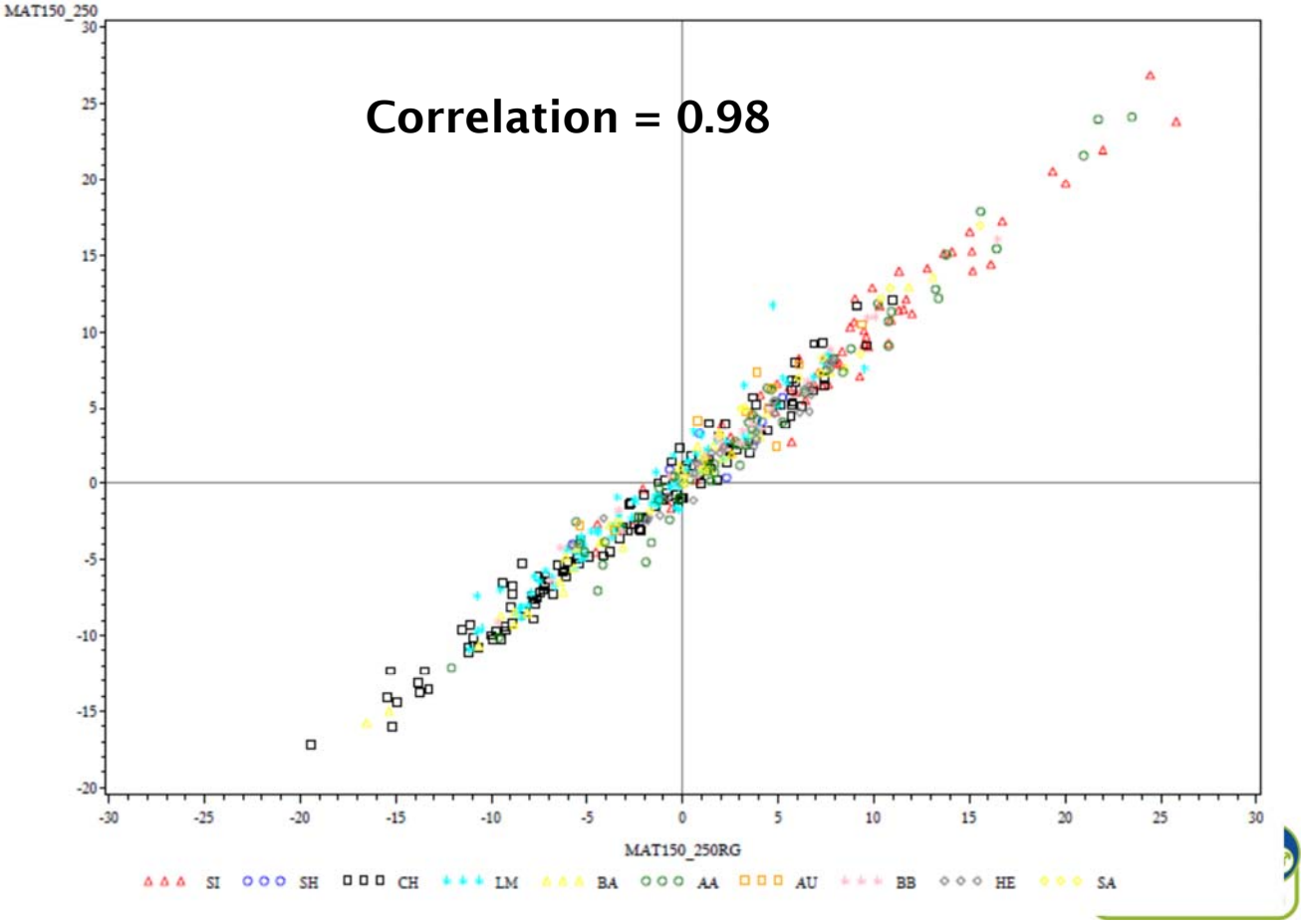
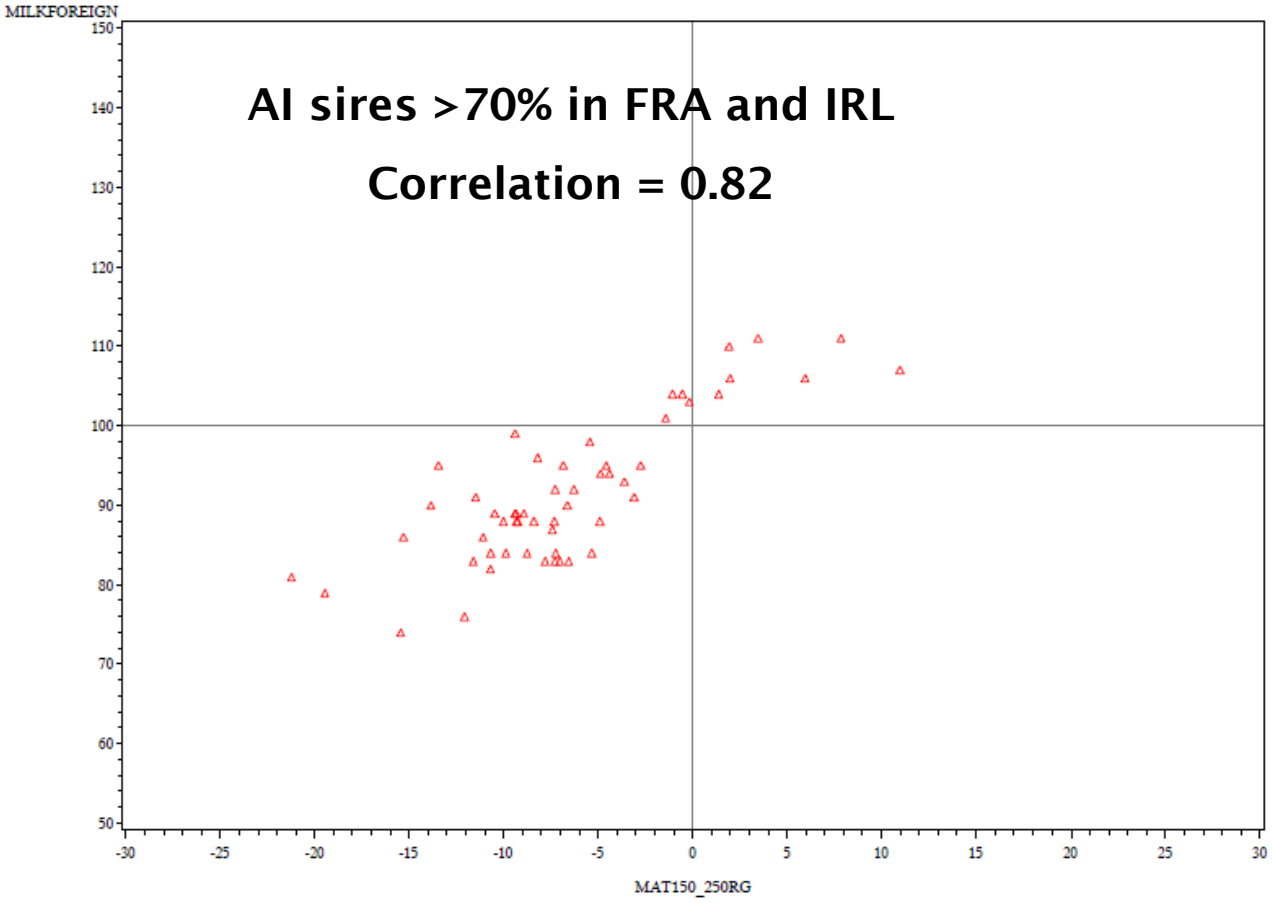
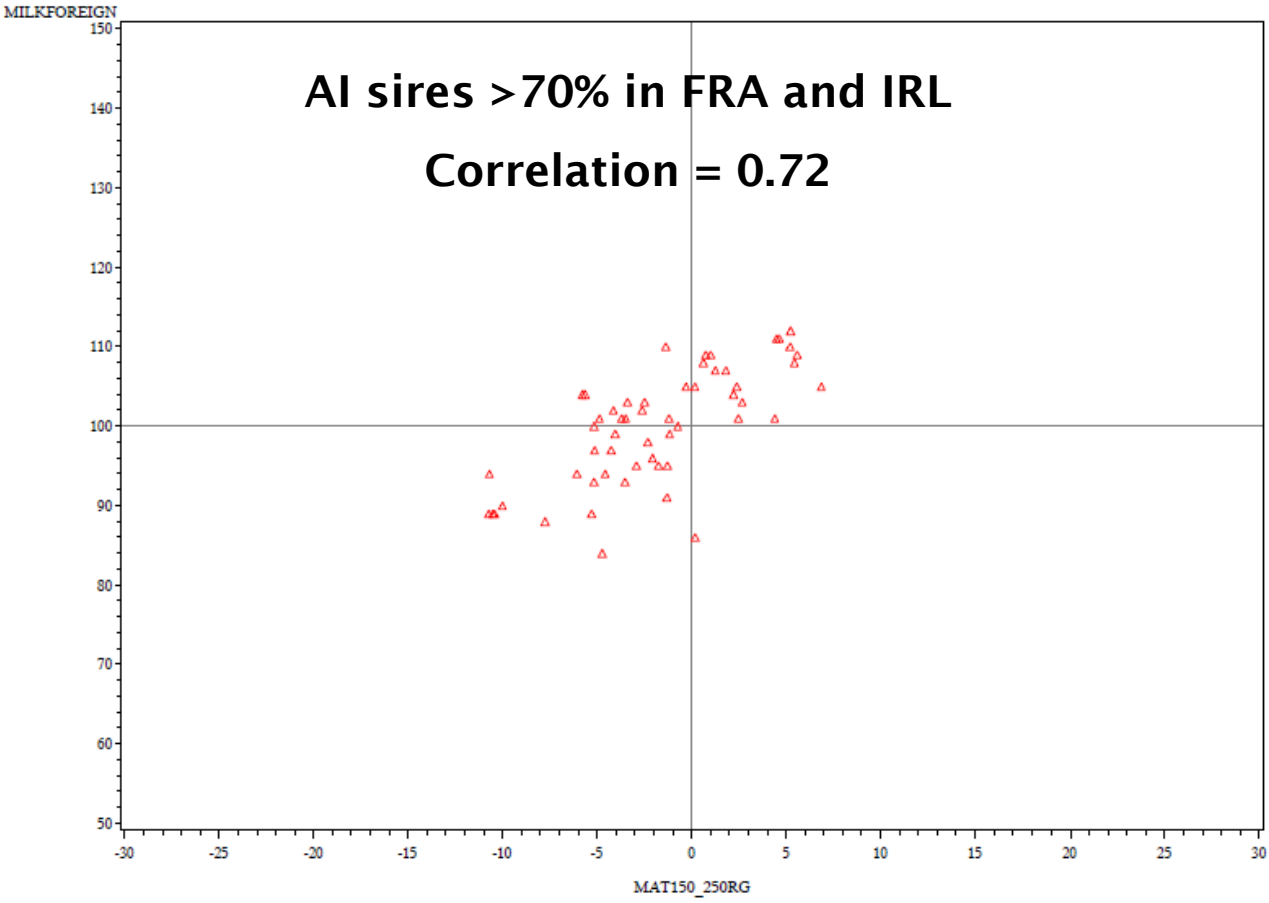


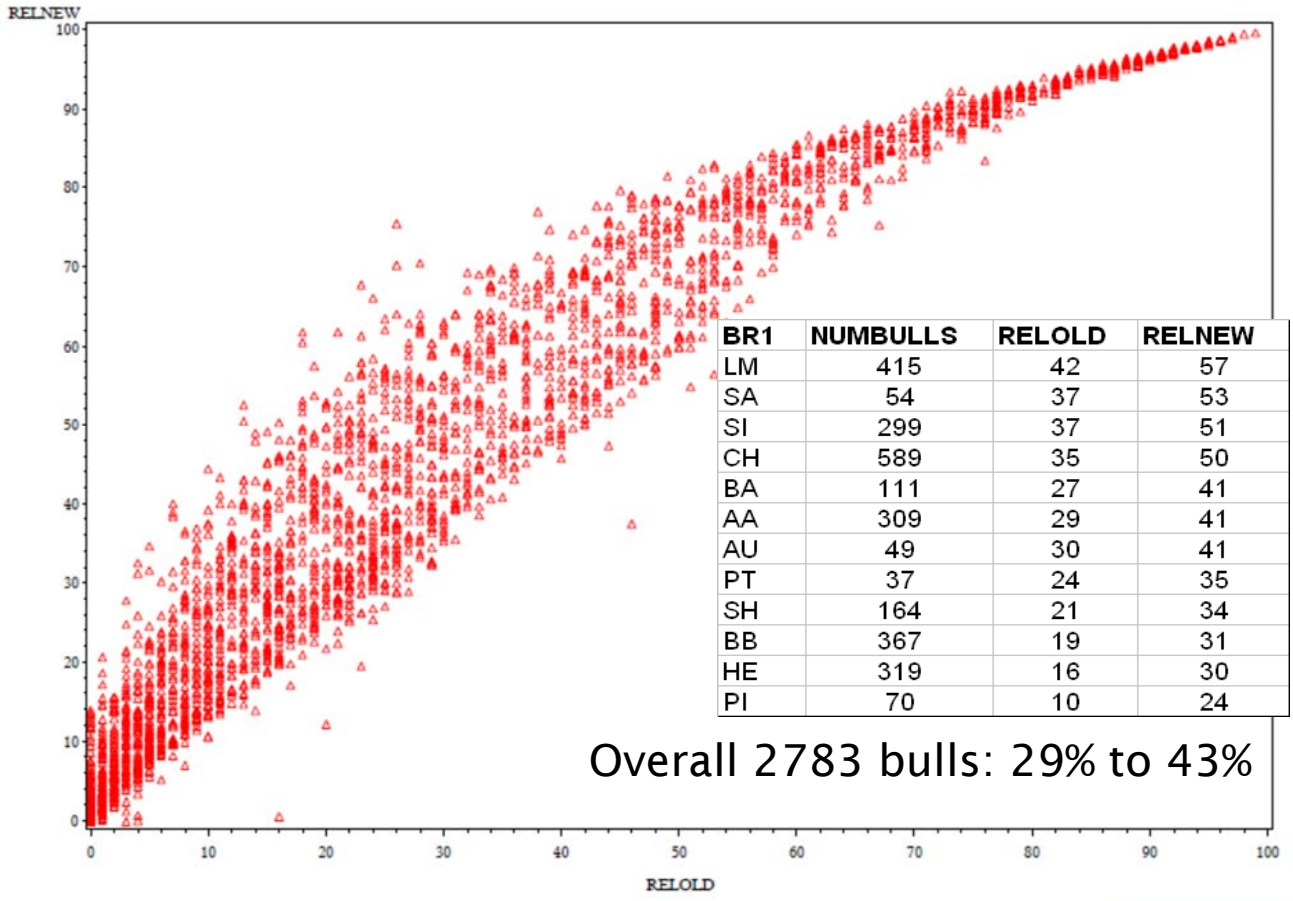
CH new 150-250 WITH rg v foreign proof



LM new 150-250 WITH rg v foreign proof



compare old versus new reliability for AI bulls



BR1	NUMBULLS	RELOLD	RELNEW
LM	415	42	57
SA	54	37	53
SI	299	37	51
CH	589	35	50
BA	111	27	41
AA	309	29	41
AU	49	30	41
PT	37	24	35
SH	164	21	34
BB	367	19	31
HE	319	16	30
PI	70	10	24

Overall 2783 bulls: 29% to 43%

Compare AI sires across breed (>50% rel)

ACROSS Breed STAR	No. SIRES	Number of CG comparisons	Number of grand progeny	Progeny 150-250	Herdmate 150-250	Difference	Current milk pd
*****	192	32	60	305	298	7	15
****	190	37	59	297	293	4	9
***	219	51	106	297	295	2	3
**	230	37	73	293	294	-1	-2
*	265	35	65	295	298	-3	-9

Test ACROSS Breed STAR	No. SIRES	Number of CG comparisons	Number of grand progeny	Progeny 150-250	Herdmate 150-250	Difference	Test milk pd
*****	240	31	55	307	295	12	10
****	176	38	70	300	298	2	4
***	161	53	105	297	294	3	2
**	225	43	78	296	296	0	-1
*	294	33	68	289	297	-8	-8

5* Across breed current: 5 breeds represented

5* Across breed New: 12 breeds represented

Comparison of Grange cows

- Access to a milk yield estimate from Grange herd on 105 cows
- Calves weighed before and after and difference = milk yield
- Average = 6.9 kg
- Min = 1.4, Max = 13.2, sd = 2.9
- 80 of the cows have weaning weight from linear scoring session (different weighing)
- Correlation of 0.43 with the new proofs
- Need to get access to the actual weights from this weighing session and include them into the evaluation and see the correlation
- Very useful independent measure of milk yield for comparison

Further work

- **New evaluation for industry meeting**
  - **Reliabilities update for new data**
  - **More new data to come as busy time for weanling sales**
  - **New data from last 3 months increased the sd of the proofs by 0.2 from previous run**
    - **Good quality weaning weight data in the 150-250 day age range is the key!**
- **Target implementation Dec 2011.**

Beef Fertility evaluations

Current beef evaluations

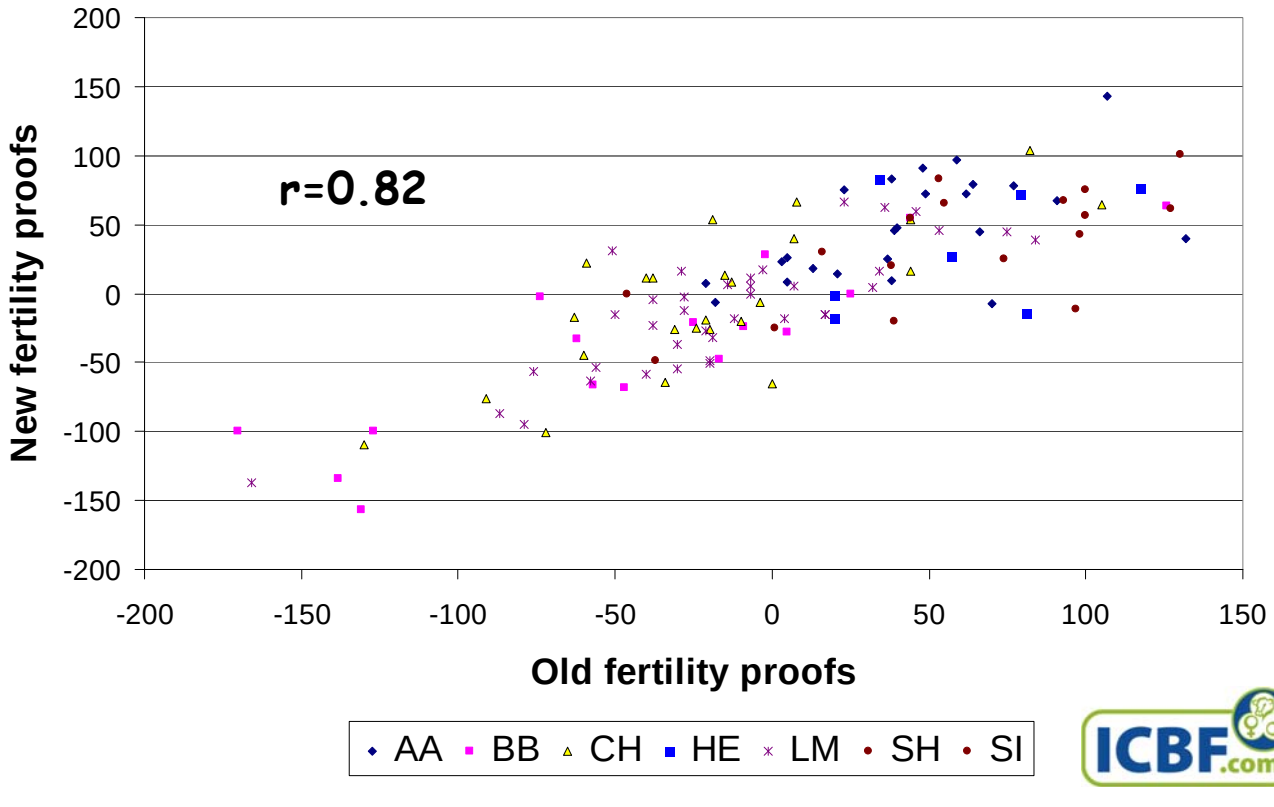
- Parity 1 only
- Contemporary group defined within parity 1 animals (loss of data)
- Calving interval and survival in multi-trait evaluation

→Low reliability!!

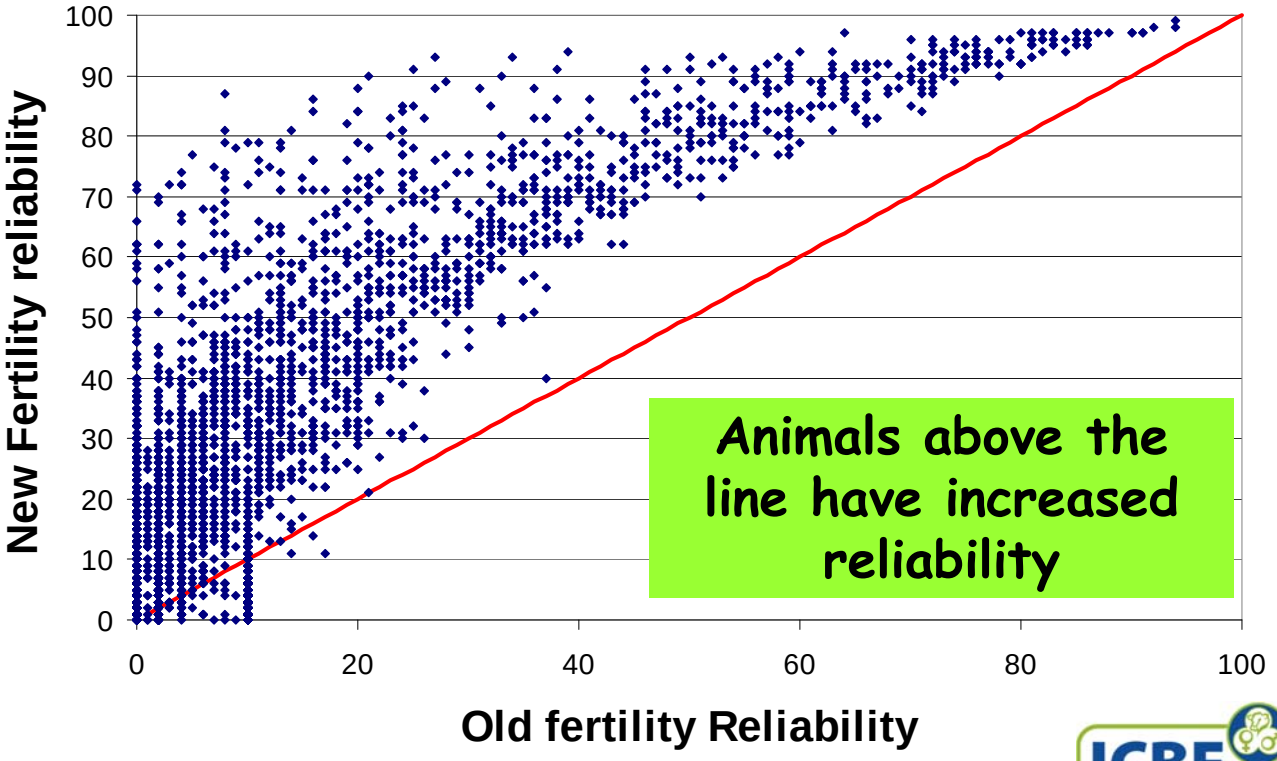
New evaluation

- **More data (i.e., more lactations and more recordings – suckler welfare scheme)**
  - Lactations 1 to 10
  - Redefinition of contemporary group across parities
- **Better statistical model – increase heritability**
  - Better definition of contemporary group for age at first calving
  - Repeatability model
- **Use of predictor traits**
- **calving in the first 42 days of calving season (heifers and cows separately)**
  - Live-weight, muscularity, docility, price, carcass traits, cow milk and docility scores

Relationship with old evaluation



Effect on reliability



Conclusions

- Work almost completed
- Testing of heterogeneity of variance
  - (caused by management differences between herds)
  - Age at first calving
  - Calving interval
- Work scheduled for coming weeks
- Target implementation December 2011.

Calving Performance Evaluations

Calving Performance

- Separate calving on heifers vs calving on later parities rather than including overall parity effect
- New genetic parameters
- Use gestation & mortality as correlated traits
- Dropping historical data

Calving Performance

- Currently based on parameters that were estimated a number of years ago
- Large increase in data in the last number of years
- Estimates of heritability based on records across all lactations
- Is heifer calving/gestation a different trait?

Current Model

- Evaluate calving difficulty, maternal calving difficulty, gestation, mortality
- No correlation between traits except a negative 0.7 correlation between direct and maternal calving difficulty
- Historical calving data used as a correlated trait for each trait

Heritabilities

Current Estimates

	heritability
Calving Diff	0.25
Gestation	0.40
Mortality	0.01

New Estimates

	heritability
Calving Diff	
1st	0.13
Later	0.07
Gestation	
1st	0.45
Later	0.40
Mortality	No estimate

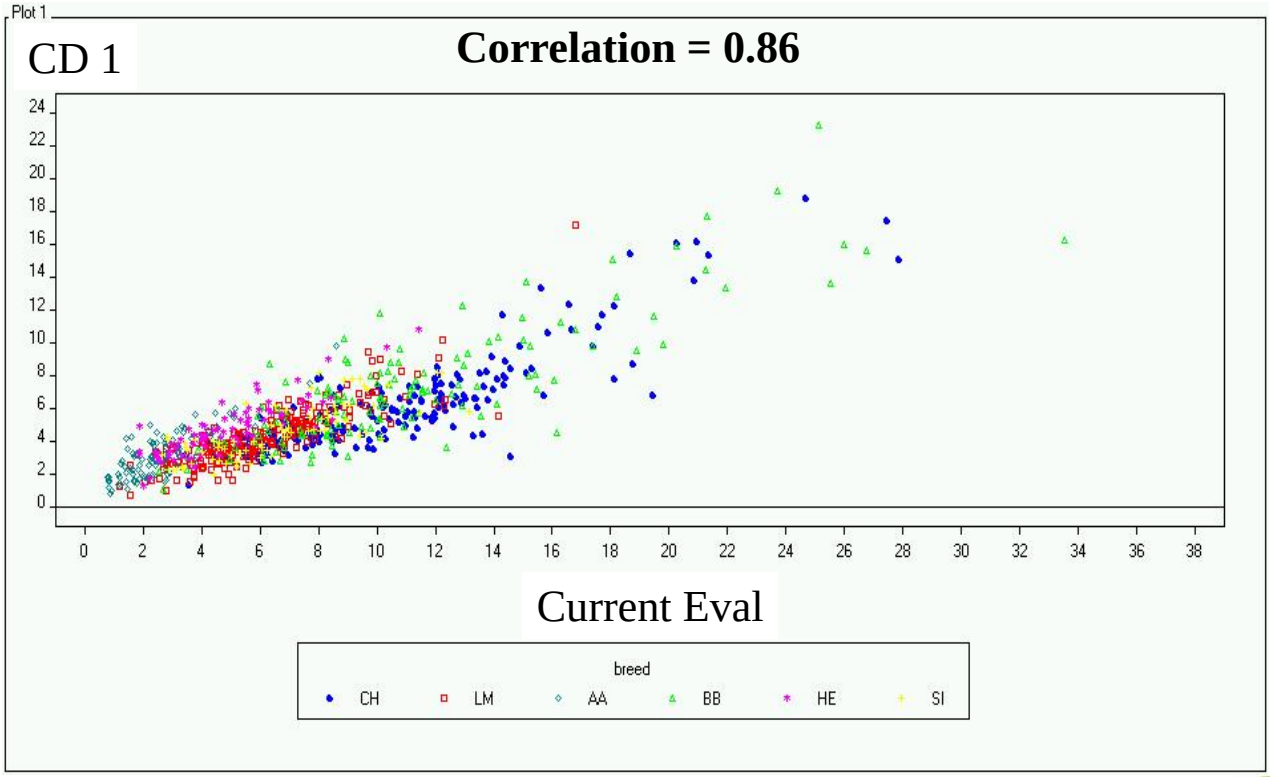
New estimates in line with those in the literature

Correlations

Correlation between direct and maternal – current estimates indicate that daughters of bulls that are easy calving have difficulty calving themselves

	Current	New
CD-MCD	-0.7	
CD-MCD -1st		-0.48
CD-MCD - later		-0.24

Results



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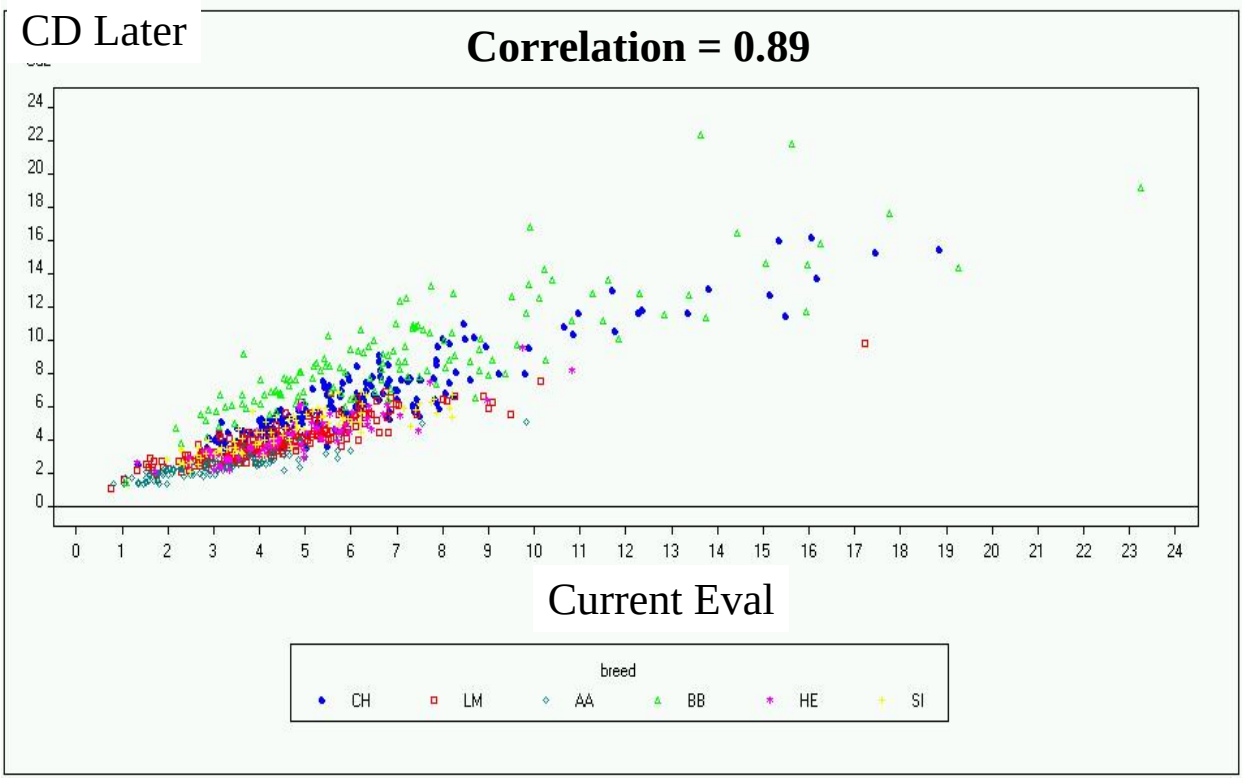

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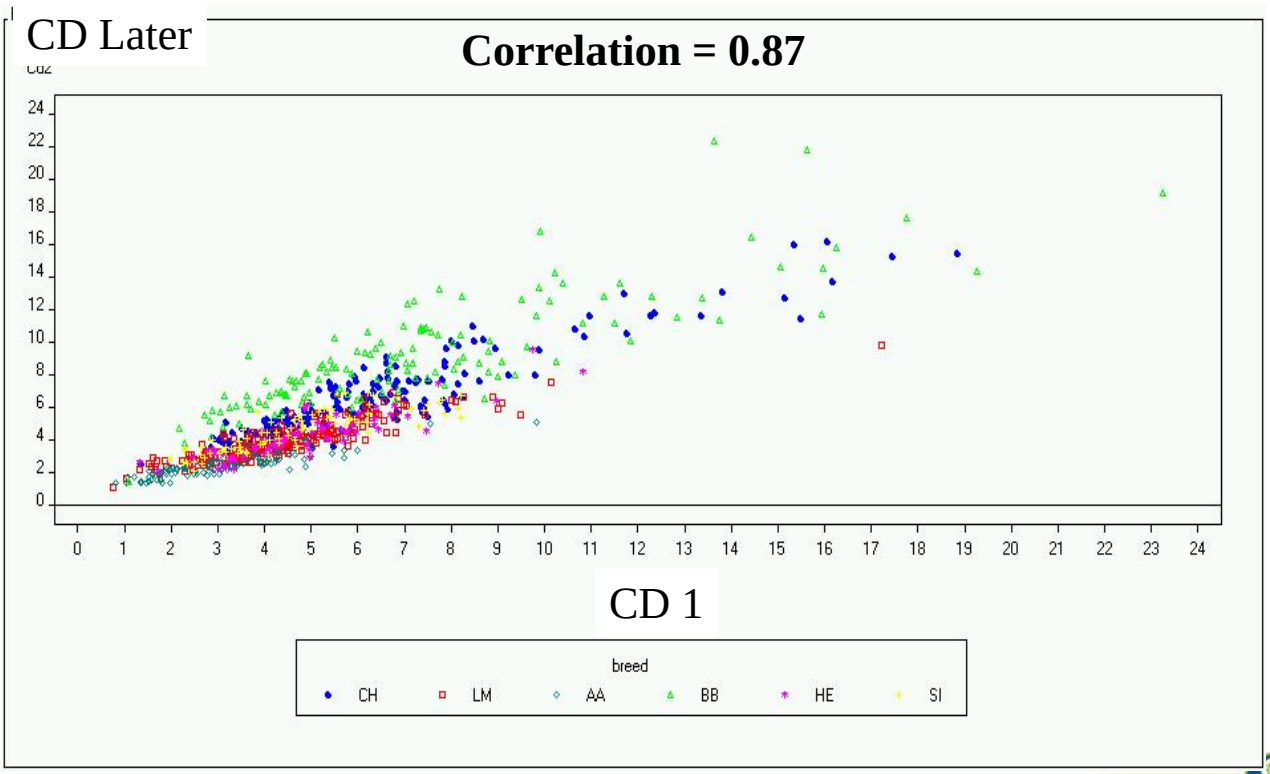
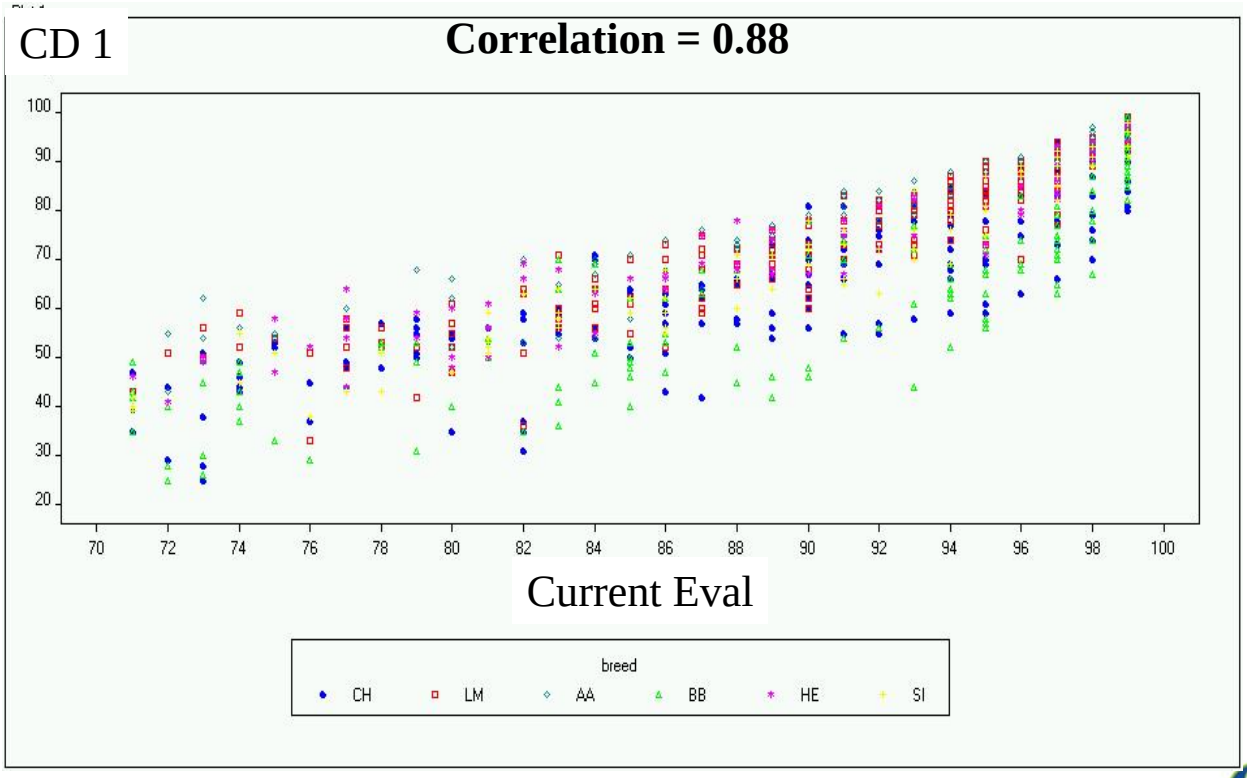


Results

Variable	N	Mean	Std Dev	Minimum	Maximum
Current CD	795	7.51	4.54	0.8	33.6
CD Heifer	795	5.20	2.80	0.8	23.3
CD Later	795	5.27	2.98	1.1	22.3

Results - Reliability



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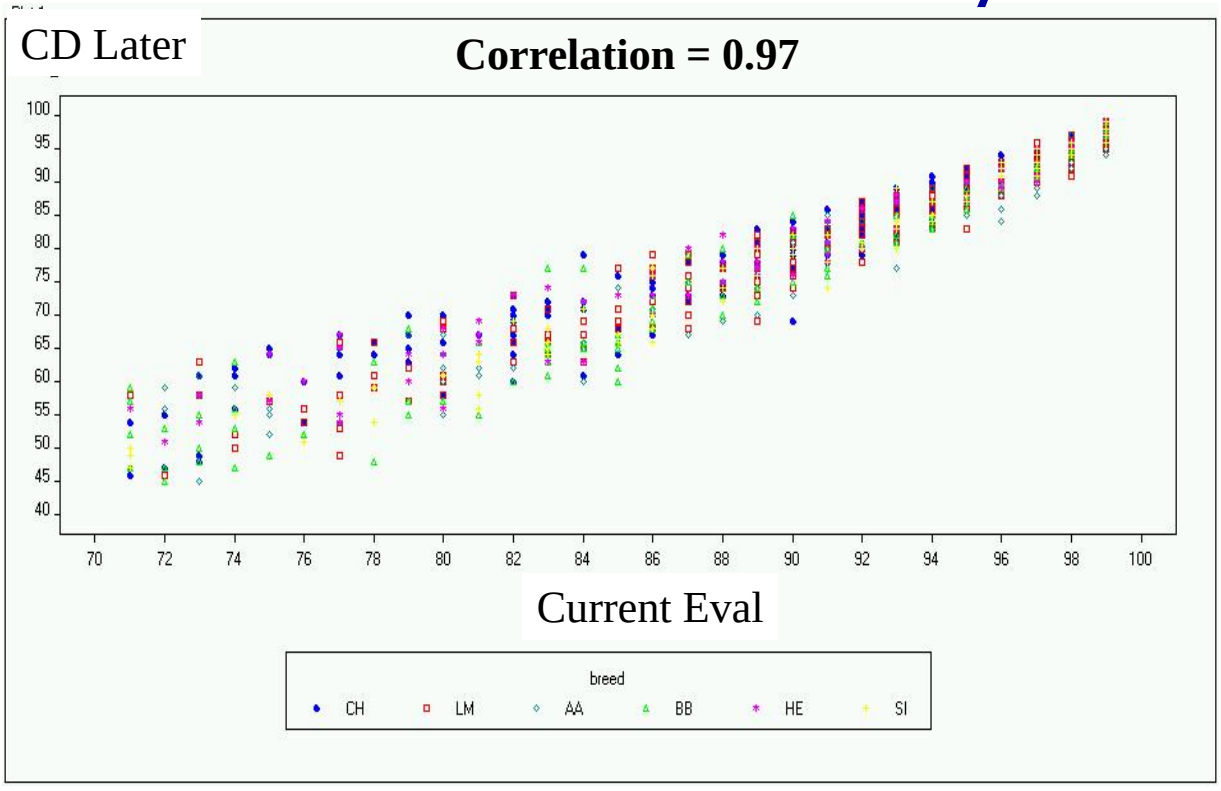

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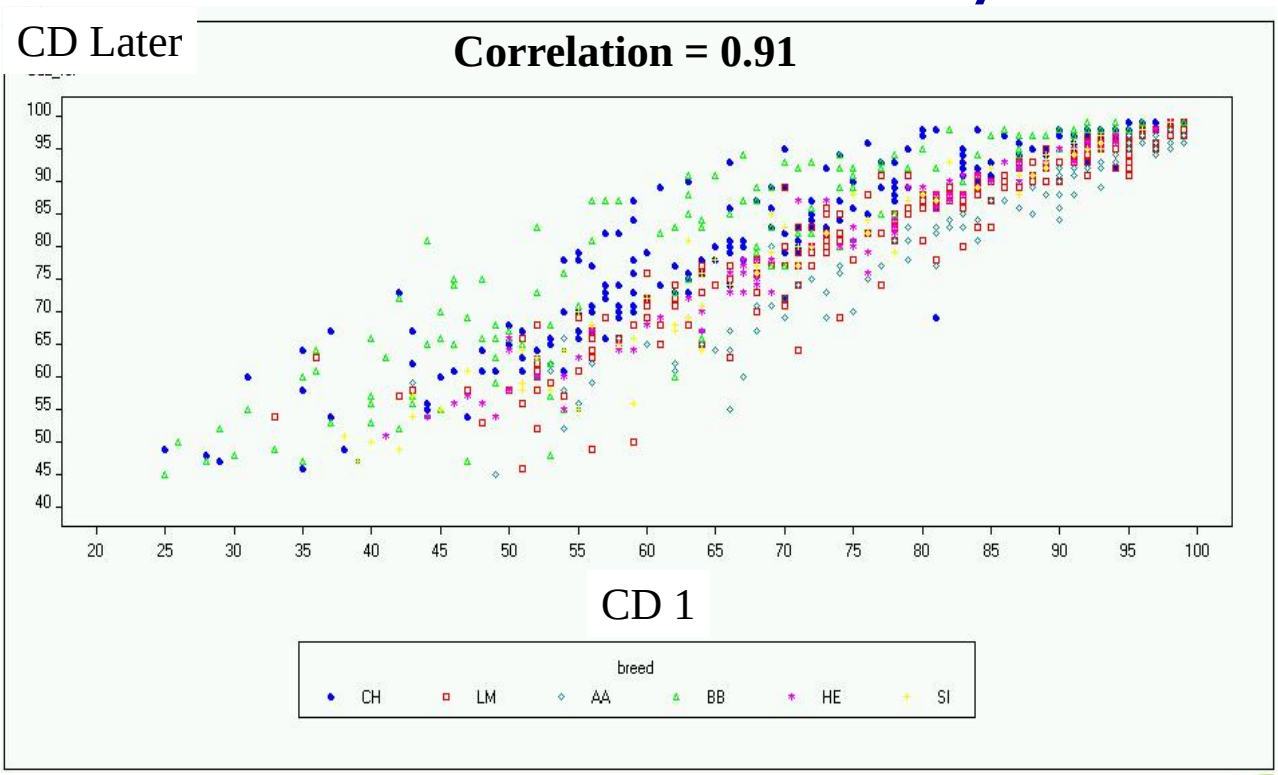

Results

Variable	N	Mean	Std Dev	Minimum	Maximum
Current CD	795	90.1	8.0	71	99
CD Heifer	795	72.5	17.6	25	99
CD Later	795	80.6	14.2	45	99

Summary

- Correlations with previous proofs are high but significant individual changes
- Some bulls easier on heifers?
- Lower heritabilities for calving diff will result in lower reliabilities especially for new test bulls
- Biologically a model with 1st and later parities evaluated separately should be used for CD
- Publication of both traits with associated economic values?
- Direct calving will have less of an impact on maternal calving due to a lower correlation

ICBF.com

Summary

- The new evaluation has passed Interbull tests for suitability for international evaluations for dairy bulls
- New gestation, mortality and maternal proofs will also be provided
- Inclusion of foreign data is currently underway
- Feedback on the proofs is welcomed
- Target implementation December 2011.
- Future work in this area; incorporation of birth weight data to be collected in 2012+.

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Data Reliability Proposition.

Killeshin Hotel, Portlaoise.
28th October 2011.

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What is data reliability?

- The confidence that you can place in a bull (or cows) proof.
  - Higher is better.
  - Varies depending on trait (heritability).
  - Varies depending on "category" of animal (e.g., young bull, stock bull, AI bull).
  - Influenced by quality & quantity of data.
  - Based on the animals in the proof (can change as more data becomes available).

Current reliability limits.

- Database.
  - All evaluations are loaded regardless of data reliability.
- ICBF Bull Search.
  - All evaluations are presented regardless of data reliability.
- €uro-Star catalogues.
  - Evaluations for bulls that are bottom 10% for given trait (within breed) are presented as "not available".
- ICBF Active Bull Lists (published).
  - Bull must be >=50% rel on SBV and >=50% rel on calving sub index to be on "published" list.
  - All AI bulls (& all information) presented on website list.

What are the issues?

- AI bulls appearing on website & active bull list with potentially 0% reliability for certain traits.
- Reliability criterion on catalogues doesn't appear to be "consistent" across traits.
  - Single criterion for all traits?
- There is little understanding of the concept of reliability.
  - What is ICBF & Teagasc's role?
  - To "protect" farmers or instil the principle of "buyer beware".

Propositions (i)

1. Undertake an analysis of all traits *(including new traits)* and revert with a proposition regarding publication criterion for each.
   - Database, website, catalogues & Active Bull List.
2. Initiate a piece of work to provide more detailed information around each trait and for each animal (on website).
   - Number of registered progeny.
   - Number of records in each evaluation.
   - Broken down by pedigree and commercial.

Propositions (ii)

3. Highlight (on website and potentially bull lists) bulls that are deemed proven for; (i) calving, (ii) terminal, (iii) maternal & (iv) overall indexes.
4. Initiate a piece of work with Teagasc to promote understanding of the term “data reliability”.
5. Launch herd “data quality” index.
6. Are there other pieces of work that we should be doing?

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Other projects.

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Other projects (i)

- On-farm weight recording using weigh scales, platform, "blue-tooth" technology & handhelds.
- Birth weight project.
- Herd data quality index & recording protocol document.
- G€N€ IR€LAND.

Other projects (ii)

- Stock bull durability.
  - Initial analysis; Service days, service years & stock bull score. No indication of genetic variance.
  - Highly relevant and interesting trends for ICBF and beef herdbooks.
    - Pedigree bulls versus non pedigree bulls.
  - Time to be devoted at next HB technical meeting.
- Testing the accuracy of maternal proofs.

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Testing the accuracy of maternal proofs.

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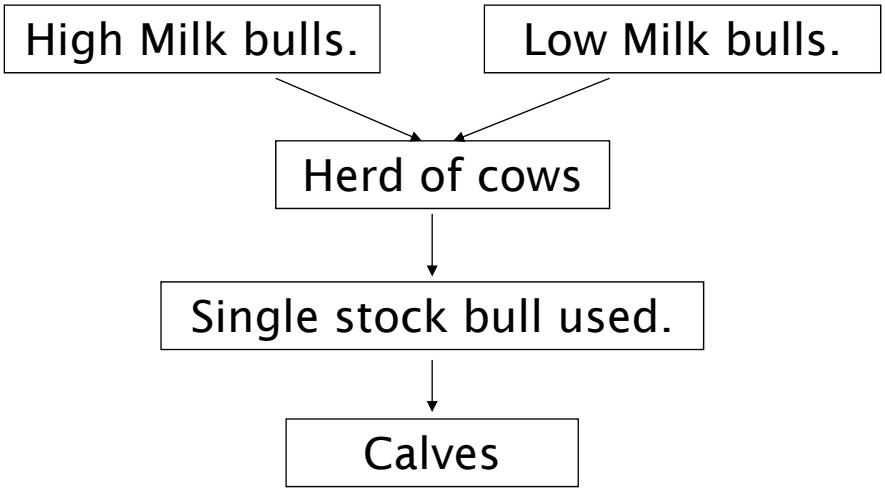
How should we test the "accuracy" of proofs?

- Weanling & carcass traits.
  - Results from research & National data have confirmed the value of €uro-stars.
- Maternal milk traits.
  - Results more difficult to ascertain due to complexity of separating direct and maternal effects in raw data.
  - Need a "more structured" approach.

Proposition.

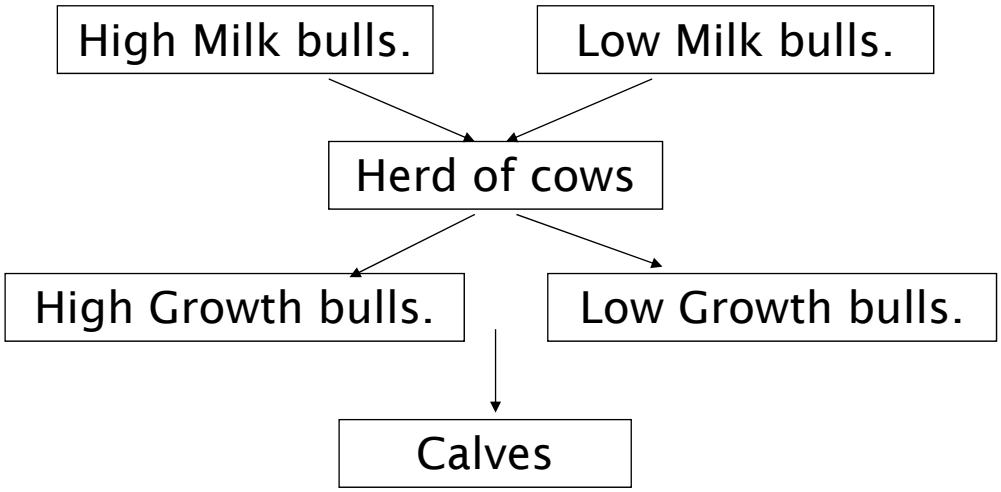
- Project involving ICBF, Teagasc and beef herdbooks.
- Identify G€N€ IR€LAND & pedigree herds with good ancestry and data recording (~30 herds * 1000 cows).
  - Range of maternal grand sires used (high milk bulls & low milk bulls).
  - Using one of more bulls (AI or stock bull) to breed calves.
- Evaluate performance of progeny.
  - Accurate recording of all relevant data.
  - Birth weight & multiple on-farm weights.

Research project (i)



- Difference in calve weights should be due to genetic index of maternal grand sires;
  - (weight of High Milk calves – weight of Low Milk calves)
- Test this hypothesis using; (i) historical data, and (ii) data going forward.

Research project (ii)



- Difference in calve weights should be due to genetic index of maternal grand sires;
  - [(weight of HM * HG calves) – (weight of LM * HG calves)]
  - [(weight of HM * LG calves) – (weight of LM * LG calves)]
- Test this hypothesis using; (i) historical data, and (ii) data going forward.

What next?

- Identify ~30 herds (15 G€N€ IR€LAND & 15 pedigree) to be involved in the project.
- Undertake analysis of “historical data”.
- Ensure data capture systems are in place for future data.
  - Same/similar herds as “birth weight” project.
- Valuable reference point going forward.
- Feedback?