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1. Overall Introduction

The Irish Cattle Breeding Federation (ICBF) produces genetic evaluations - Euro-Star indices - on beef animals using data that farmers and the Cattle Breeding Industry enter into the ICBF Cattle Breeding Database. ICBF has a Cattle Breeding Information service called Herdplus® which provides useful breeding and management information to enable farmers to make better informed decisions.

Farmers can then use this information to increase genetic gain within their herd. Maximising farm profit through genetic improvement is critical to improving incomes on Irish farms. ICBF is providing Irish agriculture with the information to achieve this gain.

The purpose of this document is to provide information on how to:

1. Interpret Euro-Star indexes on beef cattle.
2. Ensure accurate Euro-Star indexes through data recording.



2. Overview of Beef Euro-Star Indexes

Stephen Conroy, Pat Donnellan, Brian Wickham & Ross Evans (ICBF)

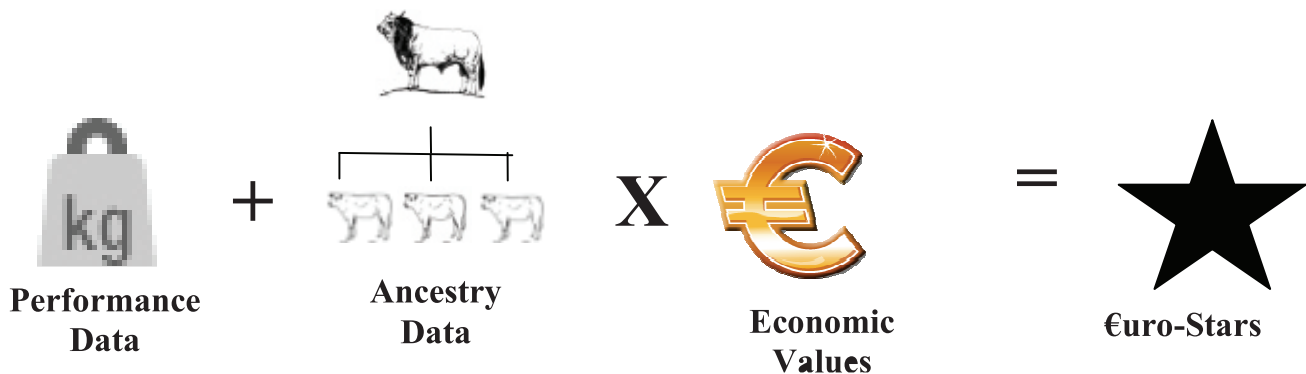
2.1 Introduction

ICBF¹ calculates and publishes the Euro-Star genetic evaluations for beef cattle in Ireland. The ICBF database contains **Performance Data** (calving surveys, weights, deaths, movements etc) and **Ancestry Records** (Sires & Dams). **Economic Values** have also been calculated for all the traits and are stored in the database.

2.2 How are Euro-Stars calculated?

The Euro-Stars are the end result of a series of routine steps (figure 1) otherwise known as a 'Genetic Evaluation Run'. In simple terms a genetic evaluation run will identify all of the relatives of a bull and compares their performance records to those of their herdmates. It then applies the economic values to the results, as some traits are more valuable than others e.g. 'Liveweight' is a more valuable trait than 'Coat Colour'. The results are in Euro's as, ultimately, this whole process is describing how profitable (or not) the progeny of a bull are predicted to be. The Euro-Stars make these Euro values visually easy to understand. The better the Euro value the more stars a bull will have.

Figure 1. Steps involved in obtaining Euro-Star figures.



¹ The Irish Cattle Breeding Federation Society Ltd – www.icbf.com .

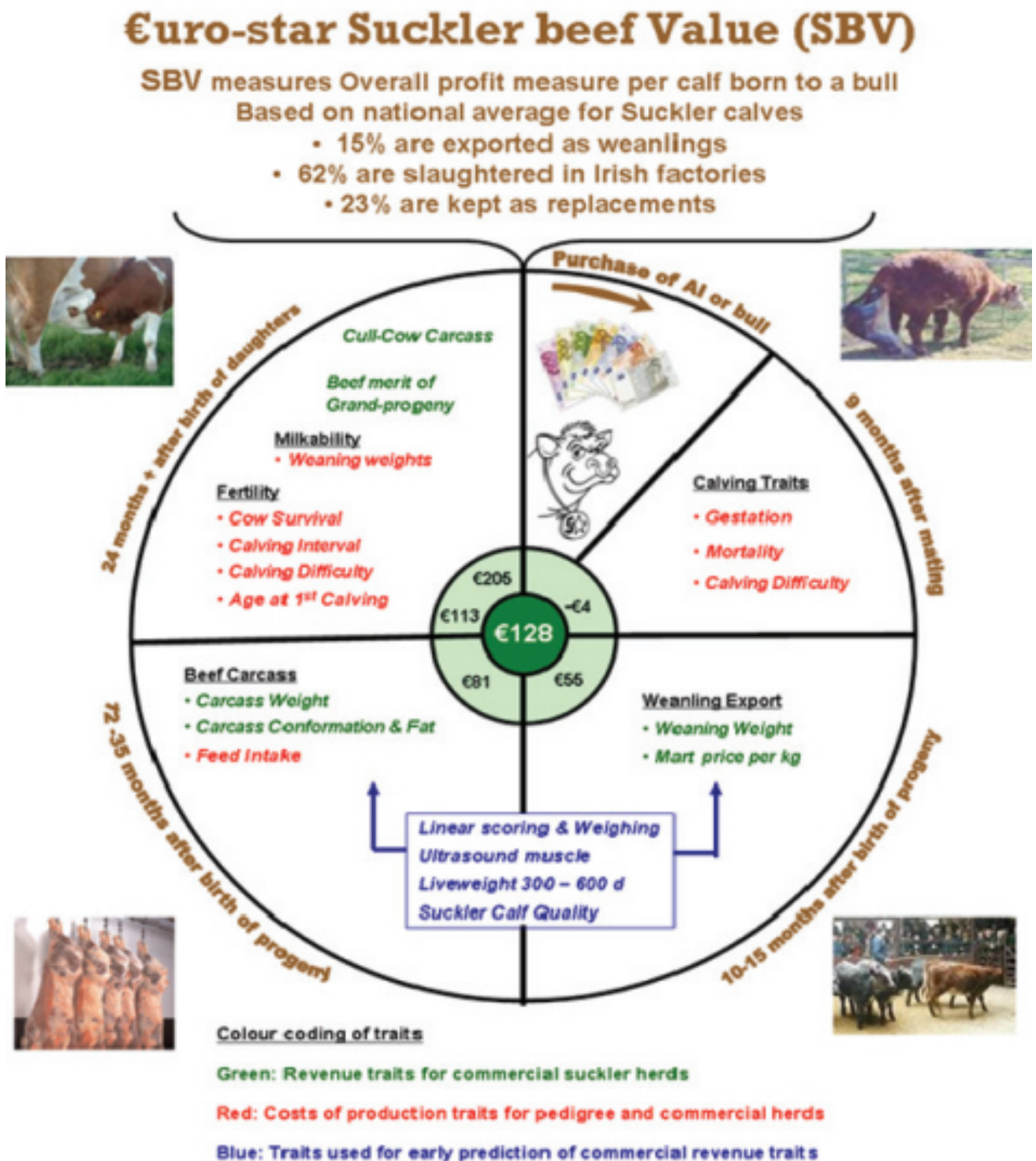
TABLE 1

Table 1 shows the different data sources, how the various traits are grouped together, their economic values and their % emphasis in the overall make-up of the Suckler Beef Value.

Table 1. Beef €uro-Star flow diagram.

Beef €uro-Star Flow Diagram 2011										
Source		Traits	Economic Values	Traits % Weighting		Sub - Index	% Weighting		★	
Animal Events	➡	Calving Difficulty	-2.96	62%	➡	Calving	7%	➡	★	
AI Handheld & Web		Gestation Length	-2.12	28%					★	
DAF-AIM		Calf Mortality	-5.34	10%					★	
Marts & On-Farm	➡	Weaning Weight	1.55	34%	➡	Weanling Export	14%	➡	Overall Suckler Beef Value	
Linear Scores		Calf Quality	2.58	66%						
SCWS										
Marts & On-Farm	➡	Weaning Weight	1.29	8%	➡	Beef Carcass	52%	➡		
Factories		Carcass Weight	2.5	30%						
		Carcass Conformation	14.77	9%						
		Carcass Fat	-7.86	5%						
Tully		Feed Intake	-0.1	48%						
DAF-AIM	➡	Cow Survival	16.19	12%	➡	Daughter Fertility	20%	➡		★
Animal Events		Calving Interval	-7.51	49%						
		Age at First Calving	-1.38	16%						
		Maternal Calving Difficulty	-9.98	23%						
On-Farm Weights	➡	Maternal Weaning Weight	9.9	100%	➡	Daughter Milk	7%	➡	★	

Figure 2. Breakdown of traits used to make up the Euro-Star Suckler beef Value



2.3 Variation in Euro-Stars from Run to Run.

€uro-Stars (figure 2) can change between genetic evaluation runs due to new data being included and in some cases due changes to the genetic parameters and evaluation methods used. Table 2 shows the change in €uro-Star indexes for Suckler Beef Value (SBV) between August and December 2011 evaluations for AI sires across breed based on different reliability categories. For animals that have a reliability of less than 25%, movement in SBV was from -€71.39 to +€118.8, while animals with 99% reliability for SBV had a much smaller change (from +€0.28 to +€6.77), thus showing that as animals increase in reliability the changes in their evaluations from run-to-run becomes smaller. A similar trend can be seen for the Beef Carcass Sub Index (Table 3) and Calving Sub Index (Table 4).

Table 2. Minimum, maximum, average and movement in genetic evaluations for Suckler Beef Value (SBV) based on AI sires of different reliabilities.

Reliability category	No. of Sires	Average SBV (€) (Aug eval)	Average SBV (€) (Dec eval)	Min SBV (€) (Dec eval)	Max SBV (€) (Dec eval)	Average diff (€) between Aug and Dec eval*	Max reduction (€) between Aug and Dec eval	Max increase (€) between Aug and Dec eval
99%	3	88	91	63	110	3	0.28	6.77
95% to 99%	103	61	64	-56	157	3	-27.72	50.4
85% to 95%	260	64	63	-62	181	-1	-49.96	53.27
70% to 85%	414	64	63	-63	195	-1	-53.25	68.43
50% to 70%	506	57	57	-98	206	0	-69.07	64.64
25% to 50%	876	54	55	-78	198	2	-70.91	91.59
less than 25%	576	49	50	-52	174	1	-71.39	118.8

*Average difference between August and December 2011 evaluation

Table 3. Minimum, maximum, average and movement in genetic evaluations for Beef Carcass Sub Index (BCSI) based on AI sires of different reliabilities.

Reliability category	No of Sires	Average BCSI (€) (Aug eval)	Average BCSI (€) (Dec eval)	Min BCSI (€) (Dec eval)	Max BCSI (€) (Dec eval)	Average diff (€) between Aug and Dec eval*	Max reduction (€) between Aug and Dec eval	Max increase (€) between Aug and Dec eval
99%	16	87	88	24	152	1	-3.42	5.33
95% to 99%	276	66	67	-65	171	1	-10.61	15.56
85% to 95%	383	58	60	-66	165	1	-13.96	33.05
70% to 85%	398	52	54	-88	175	2	-28.39	38.95
50% to 70%	491	48	50	-92	187	2	-41.18	37.21
25% to 50%	792	46	49	-92	175	3	-45.58	84.4
less than 25%	382	26	30	-64	154	4	-44.82	83.26

*Average difference between August and December 2011 evaluations.

Table 4. Minimum, maximum, average and movement in genetic evaluations for Calving Sub Index (CSI) based on AI sires of different reliabilities.

Reliability category	No of Sires	Average CSI (€) (Aug eval)	Average CSI (€) (Dec eval)	Min CSI (€) (Dec eval)	Max CSI (€) (Dec eval)	Average diff (€) between Aug and Dec eval*	Max reduction (€) between Aug and Dec eval	Max increase (€) between Aug and Dec eval
99%	121	7.4	7.4	0.8	25.2	-0.06	-0.66	0.61
95% to 99%	280	7.2	7.1	0.8	26.2	-0.08	-2.91	1.05
85% to 95%	419	6.6	6.6	0.8	27.5	-0.01	-2.15	3.22
70% to 85%	413	6.4	6.2	0.9	32.2	-0.14	-10.5	3.44
50% to 70%	474	6.1	6	0.8	28.9	-0.03	-12.79	5.4
25% to 50%	681	6.1	6.1	0.8	29.1	0.01	-8.77	5.52
less than 25%	350	5.5	5.6	0.9	24.5	0.15	-6.09	8.21

*Average difference between August and December 2011 evaluation.

“As reliability increases the movement in Suckler Beef Value and each of the sub-indexes decreases, thus displaying the importance of good data recording”

2.4 What does ‘Heritability’ mean?

Heritability is an estimation of the relative contribution of genetics and environment to a specific trait. It is expressed as a percentage figure. The higher the heritability the less the environment influences the performance of the animal and vice versa for lower heritability traits.

For example; a trait with a high heritability such as ‘Coat Colour’ (Heritability of 90-100%) is almost completely controlled by genes and not the environment.

For a trait with a medium heritability such as ‘liveweight’ (Heritability of 30-40%) a bull’s own liveweight record can be a moderately good indication of his genetic merit for that trait & can thus give an indication of what he will pass to his offspring.

For a lowly heritable trait such as ‘Survival’, a cow’s own survival record is much less useful in predicting her genetic merit for this trait as the environment has such a large effect on how long she survives. However, if we have data for enough progeny then we can get a good estimate of the genetic merit of an animal even for a trait with a low heritability.

2.5 What does the reliability % figure mean?

Reliability is a measure of the accuracy of the genetic evaluation. As more information is included in a bull's genetic evaluation the reliability % will increase. In other words the level of accuracy of the evaluation increases. The higher the reliability the more confident you can be that the evaluation will not change with more data in the future. The higher the heritability for a trait the higher the reliability will be.

Traits of low heritability, such as some maternal traits (eg fertility, survival) can be selected for successfully as there is a lot of genetic variation for some of these traits. However, to achieve a high reliability the number of progeny records in the genetic evaluation needs to be much higher than for a trait with a higher heritability.

2.6 How important are the reliability figures?

The reliability % figures are crucial to understanding how much confidence can be put in a bull's indexes. This guide (Table 5) indicates what type of data is used in the genetic evaluation for a range of reliability %:

Table 5. Level of records that account for different ranges in reliability for Euro-Star traits

Reliability % Guide		
Range		Description
0-20%	Low	Very Low - Euro-Stars mostly based on Ancestry data.
20-50%	Low - Medium	Increasingly useful. Bull's own performance affecting figures. Linear Scores & Weights could affect a Bull's figures at this stage if they are collected when animal is 150-300 days old and in a group of at least 5 animals.
50%	Medium	Best you will see in a young Bull with no progeny.
50-95%	Medium - High	Euro-Stars increasingly based on progeny records. This can be a period where most change is seen in a Bull's figures as records from new progeny are included in his evaluations.
>95%	High	Euro-Stars completely based on progeny records. Little change seen in Bull's evaluation figures.

2.7 Example 1 – Used a 5 Star AI Sire and now has a 2 Star Son of his for sale.

Q: I used a 5 Star Bull on my Pedigree Cow and now I am trying to sell the resulting Bull and he is a 2 Star Bull?

A: When Pedigree Breeder's are selecting a Bull to use on their Pedigree Cow they MUST look at the 'Reliability %' figures associated with that Bull's figures. Regardless of what a Brochure or promotional flier may display this data will ALWAYS be displayed on the ICBF Bull Search (www.icbf.com)².

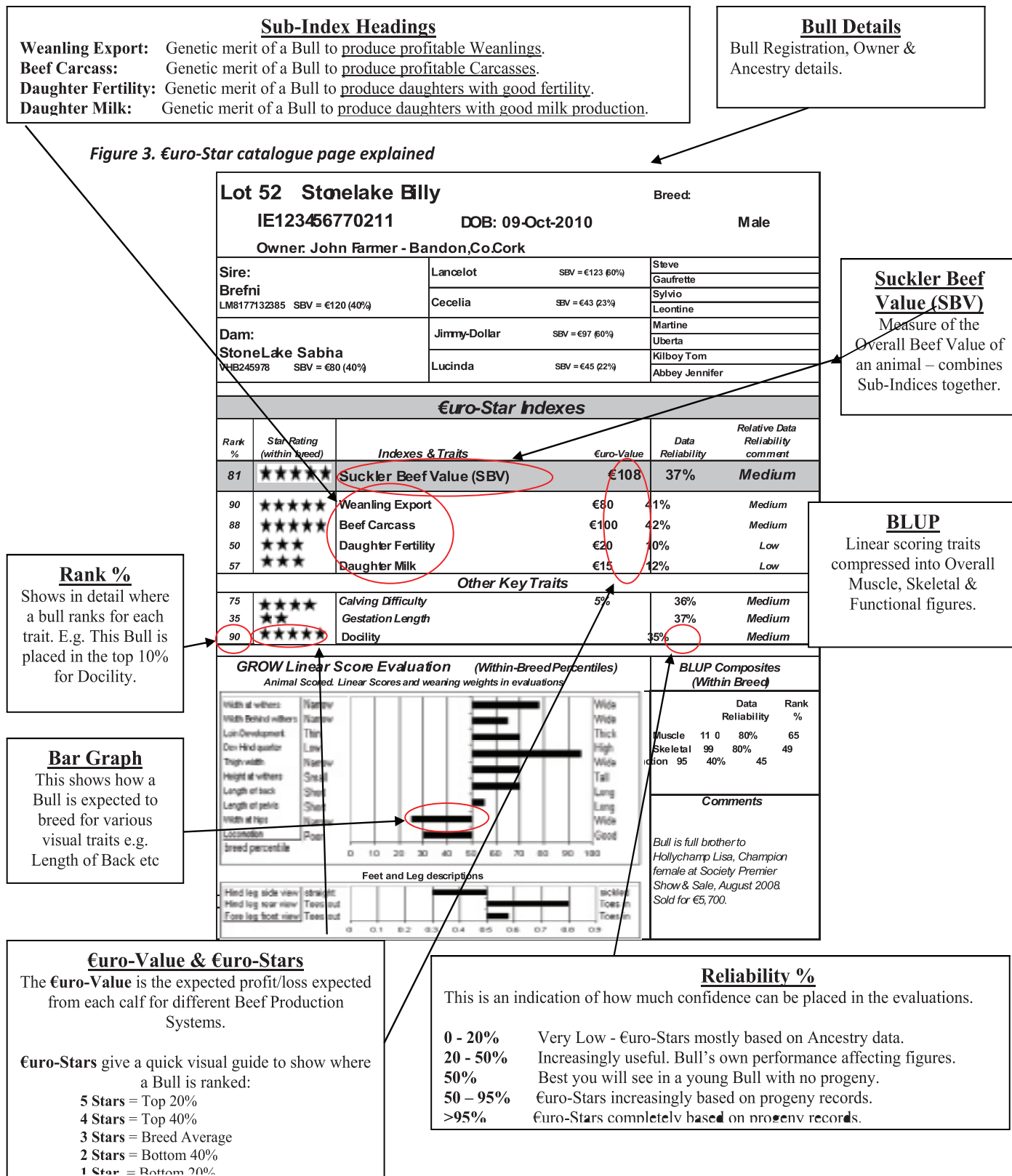
Checking the 'Reliability %' at the time of insemination is crucial, as if a Bull is being sold at 15 months old, it is 2 years since his dam was inseminated for that mating. Over those 2 years, the sire would have gone through about 6 evaluation runs. He would have had new progeny included in these evaluations over that time. If he had a 'Reliability %' figure of less than 95% at the time of the insemination then these new progeny could have caused his evaluation figures to reduce – thus having the knock on effect of the young bull for sale's figures also being reduced.

This can be the scenario for a Test bull or high profile bull that has had a high sale price or successful show career himself without having yet had many (if any) progeny on the ground. His Euro-Stars at that stage will be very much based on his own pedigree. Again, his 'Reliability %' figures will show what the chances of his Euro-Stars changing in the future will be. The flipside of this is that many of these bull's Euro-Star figures will also improve and in order to bring in new bloodlines such bulls are very important.

² Enter the bulls tag number in the bull search and press enter to obtain his genetic evaluation information.

So the general advice with such bulls is to use a number of them (teams of 5 bulls), thus spreading the risk of ending up with a lot of progeny out one particular bull whose figures have fallen.

2.8 What do all the figures on Euro-Star Catalogue page mean?



2.9 Why are the reliability % figures of the Maternal traits of my Stockbull much lower than his reliabilities for the other traits?

The heritability of maternal traits is much lower than that of the calving and growth traits. Therefore it is more difficult to account for how much of an animal's maternal performance is genetic and how much is environmental. This impacts on the speed with which the 'Reliability %' figure rises as new data is accumulated on his daughters calvings.

Also, the data used to generate the Euro-Star evaluations for 'Calving', 'Weanling Export' & 'Beef Carcass' are based on his direct progeny (sons & daughters) so this data is easily recorded (weights, calving surveys etc) and is available in large volumes (Animal Events, Marts, Factories).

However, the data used to calculate the maternal indexes is based on his grand-progeny through his own daughters. This data is either in short supply (on-farm weaning weights) or is not quickly available (e.g. survival data). That said, maternal traits do have a genetic component, however small, and are also economically very important to Suckler farmers and so, are more than worthwhile pursuing.

2.10 What is a 'Contemporary Group'?

For a genetic evaluation to be calculated for an animal, its own performance must be compared against the performance of other animals in the same herd, grazing the same grass, drinking from the same trough, exposed to the same weather etc. So a 'Contemporary Group' is the term used to describe a group of animals that are exposed to the same environment and typically:

- Are the same sex
- Are the same age
- Are receiving the same management (housing, dosing, feeding etc)
- Do not have individuals pulled out for preferential treatment.

An animal's performance in one 'Contemporary Group' in one herd can be compared to another animal's performance in another 'Contemporary Group' in another herd through pedigree links e.g. same sires used in both herds.

2.11 Why do the Euro-Star evaluations on a Bull change?

New records are constantly being added to the ICBF database, such as new calving survey scores from Animal Events sheets, and carcass grades from factories.

The main reasons for a Bull's evaluation to change are one or a combination of the following:

1. New records on the Bull himself & his herdmates (Liveweight or linear scoring).
2. New records on his progeny.
3. New records on any other relatives. E.g. full brother's progeny or his sire's progeny in another herd.
4. Changes to how the evaluation is calculated. E.g. change to economic values for particular traits and changes in the methods used. We are constantly striving to improve the methods we use. Changes are implemented only after the completion of thorough research and consultation with the industry.

2.12 When do the Euro-Stars stop changing on an animal?

Typically the indexes of an animal whose reliability % is over 95% can be expected to change little as more data is recorded. At that stage so much data will have already been recorded on an animal's progeny that the addition of new data will not have a huge effect on an animal's indexes. At that level of reliability the only event that could cause a dramatic shift in an animal's indexes would be a change to how the index figures are calculated.

As a Bull's first crops of calves are born and his reliability % figure starts moving up from around 50% up to 90%, is typically when the biggest shifts are seen in his figures. Changes to a Bull's figures are often seen as being unexpected by his owner if progeny of that bull are born in other herds. This is because, due to the ICBF database being able to track virtually all progeny of a Bull (and his relatives) – the performance of his progeny in other herds will affect his own Euro-Star figures.

2.13 How often are the Euro-Stars updated?

The database is updated with new data and ancestry information every day from various sources. ICBF extracts all of this data and performs:

- The Euro-Star & Linear evaluations for all animals are done 3 times a year:
 - January, April & August
- The Euro-Star & Linear evaluations for animals scored are rerun within 30 days of the scoring:
 - Monthly

2.14 What does the '% Rank' figure mean?

Each 'Star' that a bull has accounts for 20% on the scale. 5 Stars is the most a Bull can have. So, 1 Star places a Bull in the bottom 20% and 5 Stars places him in the top 20%. However the '% Rank' goes further than this. It shows exactly how high or low a Bull is ranked for any trait. It allows greater precision for example in choosing between two 5 Star Bulls – one of which is barely in the top 20% with 5 stars and the other which is in the top 1% of the breed.

% rank goes from 1% to 99%. 1% is the bottom of the scale and 99% is top of the scale. The higher the % rank the better.

2.15 What is the easiest way to read the figures – should somebody look at the Stars or the actual Index figures?

The Euro-Stars should be looked at first to quickly see how a bull ranks for a trait that interests you. After that the '% Rank' figure should be looked at to see exactly where a Bull ranks. For example, two bulls might both have 5 stars for 'Weanling Export' so both of them are in the top 20% however one might be ranked in the top 1% (% rank of 99) while the other is barely into the top 20% (% rank of 81).

Then the index figure should be looked at to understand what that ranking means in terms of Euro's of profit for that animal.

2.16 If an animal (Live import, semen, embryos) is imported, what figures does that animal start with?

If the animal is imported from the UK or France then certain types of data from either of these countries Genetic Evaluation Centres will be requested by ICBF for inclusion in the next ICBF genetic evaluation run. Table 6 shows what foreign data is currently used.

Table 6. Foreign data included in €uro-Star indexes broken down by breed

Foreign data included in €uro-Stars						
	France				GBR	
	Direct Weaning Weight	Maternal Weaning Weight	Muscle (Linear Scores)	Skeletal (Linear Scores)	Direct Weaning Weight	Maternal Weaning Weight
Angus					Yes	Yes
Aubrac	Yes	Yes	Yes	Yes		
Belgian Blue					Yes	
Blonde	Yes	Yes	Yes	Yes		
Charolais	Yes	Yes	Yes	Yes		
Hereford					Yes	Yes
Limousin	Yes	Yes	Yes	Yes	Yes	Yes
Maine Anjou	Yes	Yes	Yes	Yes		
Parthenaise	Yes	Yes	Yes	Yes		
Salers	Yes	Yes	Yes	Yes		
Simmental					Yes	Yes
€uro-Star Indexes Affected						
	Beef Carcass & Weanling Export	Daughter Milk	Beef Carcass & Weanling Export	Beef Carcass & Weanling Export	Beef Carcass & Weanling Export	Daughter Milk

As always, the ‘reliability %’ figures must be taken into account when looking at the €uro-Star figures of an imported animal as there may not be much foreign data behind the €uro-Stars. Also, if the animal has an outcross pedigree and doesn’t have many (if any) relatives in Ireland will also be indicated by way of low ‘reliability %’ figures.

3. 2012 Beef Genetic Evaluation update

In 2011 the Maternal element of the Euro-Star evaluation system was updated with many new improvements being implemented for the December 2011 evaluation run. Improvements were also made to the docility and calving performance evaluations. The following describes the changes made to the following 4 areas:

- New milk evaluation.
- New fertility evaluation.
- Cow docility evaluation.
- Calving Ease evaluation.

3.1 New milk evaluation

The old milk figure for a Bull was largely related to the weighing performance of his daughter's progeny between the ages of 150-300 days. A review of this milk evaluation has identified a number of changes which were incorporated into the December 2011 official evaluations. The new evaluation also has a substantial amount of extra information included which was not in the old evaluation. As a result there is a big impact on reliabilities for females that have a lot of progeny with weight records.

The main changes are:

3.1.1 The inclusion of cow milkability score in the evaluation as a predictor trait.

Farmers are now being asked to voluntarily score their cows for milkability and docility on a scale of 1 to 5 in and around early lactation. 130,000 scores were sent into ICBF since Spring 2011. An analysis of this data showed a very useful heritability of 0.35 for both scores.

3.1.2 Redefinition of age for 'Milk weight' data to be collected.

Data collected from the Cow Milkability survey showed that calves greater 250 days old are already eating grass and meal in sufficient quantities to dilute the milk effect from their mothers and this reduces the accuracy of a milk prediction. Therefore, the key recommendation for using weight data in the milk evaluation is to collect weights data from multiple weighings - 100 days apart between birth and 250 days of age.

3.1.3 The use of the biological relationship between Terminal and Maternal traits.

Results from Irish data and also published foreign studies indicate that there is an unfavourable relationship between growth/terminal traits in a sire's progeny and the maternal traits in the sire's daughters. Carcass weight and conformation from commercial herds and the muscle composite from pedigree herds all have an unfavourable association with maternal weaning weight. The new Milk evaluations take this negative correlation into account.

3.1.4 Suckler Replacements from the dairy herd adjusted properly.

The level of replacement sucker females sourced from the dairy herd varies from 15 to 20%. Therefore it is important to adjust for their dairy influence when predicting the milkability of their Sires. Therefore milk recording results from dairy herds is now also used as a predictor trait in the Milk evaluation.

3.1.5 Foreign milk information incorporated into the ICBF evaluation.

Many of the pedigree bloodlines in Irish beef herds have a large proportion of foreign animals. Therefore foreign information where available is used as a predictor trait (refer to table 6 for details). The foreign information from bulls which are used in several countries (for example in France and the UK) is taken from the country where the bull has the highest reliability.

3.2 New Fertility evaluation

The old fertility index was a combination of the breeding values for Age at 1st calving, Calving interval and Survival. The Calving Interval and Survival breeding values were based on first calvers only. The reason for this was due to the low level of sires that were being recorded on older beef females at that time.

As a result of Animal Events becoming a core element of the Suckler Cow Welfare Scheme, the ICBF database gained access to some 50,000 extra herds. This has substantially increased the levels of cows with known sires in the ICBF database.

The new fertility indexes contain the following changes:

3.2.1 Change in analysis of 'Age of 1st calving'.

For 'Age at 1st calving', instead of being compared against other heifers in the herd they calve in they will be compared against their herdmates from the herd they were in 9 months prior to calving. This will more accurately account for a heifer's ability to reach puberty in the event that she is sold on from the time she is inseminated to the time that she calves down for the first time.

3.2.2 The evaluation of calving interval and survival to cover a longer time period.

The evaluation of calving interval and survival will now cover a cow's reproductive history up to the start of the 11th parity. This represents a much larger time frame in a cow's life compared to the old evaluation on 1st parity only. The reliabilities will also be higher as a result.

3.2.3 The use of predictor traits to improve the 'reliability %' of the fertility proof at an earlier age.

The predictor traits that will be used include:

- Calving difficulty
- Cow's ability to calve in the 1st 42 days of the calving season
- Progeny carcass traits
- Progeny weight traits
- Linear score traits
- Calf quality & docility traits
- Cow milkability and docility scores.

3.3 Cow Docility evaluation

3.3.1 Incorporation of cow docility into docility evaluation

The old docility evaluation was a combination of farmer scored docility and linear scored docility on weanlings between the ages of 150 & 300 days. The information from the optional cow survey (Figure 4) is the first information that has been recorded on mature cow docility.

These cow docility scores have now been incorporated into the routine docility evaluation the results of which were published in the December 2011 evaluation.

Figure 4. Example of the optional cow survey for milkability and docility

100000448

Optional Cow Survey													
Herd owner: JOE BLOGGS													
Herd No: IE1234567													
Print Date: 21/01/2011													
Please give your best estimate of your cows as they were in the period from 'Calving to 3 months calved' for docility/temperament and from 'Calving to 3 months calved' for the milk score.													
Cow Jumbo	Tag number	Date of Birth	Breed	Cow Docility score VG = Very Good G = Good A = Average P = Poor/Nervous VP = Very Poor/ Aggressive (Ensure a value is circled)					Cow Milk score VG = Very Good G = Good A = Average P = Poor VP = Very Poor (Ensure a value is circled)				
032	IE123456750032	10/03/2000	HE (44%),HO (41%)	VG	G	A	P	VP	VG	G	A	P	VP
51	IE123456770051	10/07/2007	LM (44%),HE (22%)	VG	G	A	P	VP	VG	G	A	P	VP
069	IE123456770069	15/03/2004	LM (66%),HE (13%)	VG	G	A	P	VP	VG	G	A	P	VP
092	IE123456760092	27/12/2006	BB (50%),SI (22%)	VG	G	A	P	VP	VG	G	A	P	VP
095	IE123456790095	05/06/2007	LM (69%),SI (25%)	VG	G	A	P	VP	VG	G	A	P	VP

3.4 Calving Ease evaluation

3.4.1 Use of foreign information in the calving evaluation

A system of conversion equations has been developed to provide country of origin calving evaluation on bulls with an AI code in Ireland. This system uses information from bulls proven in both countries to create the equations.

These equations can then be applied to any bull coming from that particular country. Conversion equations were applied to the following breeds:

- Charolais & Limousins from France
- Simmentals & Angus from the UK

This information is published on foreign bulls where their Irish evaluation is less than 80% reliable. For bulls less than 80%, if the reliability of the foreign proof was lower than the Irish proof then the Irish proof was used.

In addition, progeny of bulls that receive a foreign proof will get a parent average based on the foreign data, unless that animal had progeny in his own calving proof.

4. On-farm data recording protocol

4.1 Introduction:

At birth an animal's index is made up of information based on that known about their ancestry. As the animal is being reared on the farm information can be obtained at different stages in the animal's life to ensure that the indexes produced on those animals truly reflect their genetics. Therefore, data recording is an integral part of ensuring accurate indexes on individual animals and the overall herd.

The following are the data recording steps that will allow pedigree breeders and commercial farmers to ensure that the Euro-Star indices of their cattle are as accurate as the possibly can be.

4.2 Recording of information for Pedigree & Commercial animals:

4.2.1 Sire selection:

It is important to look at the reliability % of a bull's Euro-Star figures before making a decision on what bull's to mate your cows to.

1. *Low to medium reliability bulls (20 to 50%):* Where possible when using low reliability bulls it is advised to use 3-5 different bulls.
2. *Medium to high bulls (50 to 95%):* Caution is advised as their figures will change as their progeny are performance recorded.
3. *High reliability bulls (>95%):* Euro-Stars are based on the performance of progeny, thus little change will occur in the evaluation figures.

4.2.2 Recording inseminations:

The date and sire details (A.I code or full tag number) of the bull the female was mated to must be recorded in the ICBF database. There are several ways that this can be done:

1. AI. Technician Handheld.
2. Farm PC Package.
3. Online (www.icbf.com).



The insemination/mating details should be recorded immediately and no more than 21 days after the event. See page 27 for further information.

4.2.3 Registration:

All calves should be registered using Animal Events immediately after they are born and tagged. The HerdPlus® Pocket Notebook is a useful aid to help record calf tag details out on the farm and then transferring it to the ICBF database.

4.2.4 DNA parentage/Genomic selection:

DNA parentage: It is advised to collect a tissue sample (hair roots) and to have it tested for parentage on all pedigree calves



within 21 days of birth, especially for herds where both A.I and stock bulls are being used and where there are a number of stock bulls used within the herd.

Genomic selection (new technology): Genomic selection is a new technology that allows animal breeders evaluate animals on the basis of their DNA profile. It is being used successfully in the Dairy industry at present and will be introduced for Beef animals once all the research has being completed. In practice, genomic selection involves taking a biological sample, such as a hair (roots) sample, from an animal and sending to a laboratory to determine the animal's DNA genotype. The research currently under way is looking at using this DNA genotype to improve the accuracy of our Euro-Star evaluations on calves. In summary, the new technology called genomic selection will increase the reliability of genetic proofs at a younger stage in the animal's life. Increases in reliability of 10 to 20 percentage units should be achievable. Once Genomic selection is available in beef it will be very important to have animals genotyped in order to increase the accuracy of Euro-Star indexes. A hair sample should be taken soon after the animal is born for this purpose.

4.2.5 Suckler Cow Welfare Scheme (SCWS):

"All beef breeding herds should be fully participating in the SCWS".

Recording data through this scheme provides valuable information for the ICBF genetic evaluation system on the following:

- The Sire and Dam of the calf:	should be recorded immediately and not greater than 21 days after birth
- Live or dead calf at birth:	should be recorded immediately and not greater than 21 days after birth
- The calving ease:	to be recorded at calving and reported at the time of calf registration
- The weaning weight:	between 150 and 250 days of age
- Docility or temperament:	to be recorded at the time of weaning
- Calf quality:	to be recorded at the time of weaning

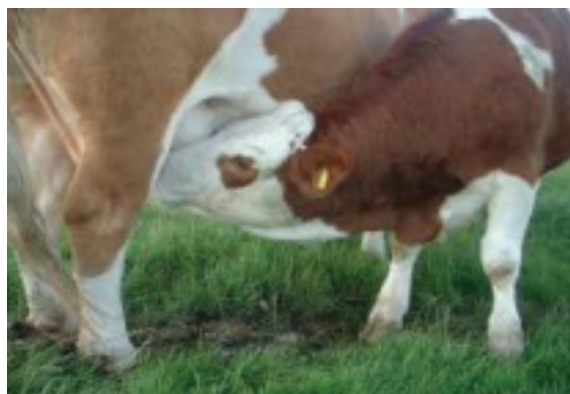
4.2.6 Weight recording and docility:

Weight recording is essential to determine the growth rate of cattle and the maternal milk of their dams.

"A minimum requirement for weighing is a birth weight along with one maternal weaning and growth live-weight, however extra weighing's will lead to an increase in accuracy of Euro-Star indexes".

The following are the recommended guidelines for weight recording:

1. **Birth weight:** Weigh or use measures on all new-born animals within 24 hours of birth. Record result immediately on ICBF database.
2. **Maternal weaning weight:** Weigh all calves from birth to weaning every 100 days and record all weights on ICBF database immediately.
3. **Growth live weight:** Weight all cattle every 100 days from weaning to slaughter and record all weights immediately on the ICBF database.
4. **Breeding stock:** All males and females should be weighed annually, with females weighed at



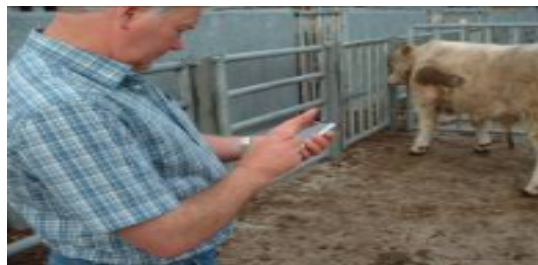
200 days into their lactation. Record all weights immediately on the ICBF database.

Docility: Docility scores should be recorded at the time animals are being weighed. All results must be reported immediately to the ICBF database.

4.2.7 Linear scoring:

Linear scoring is a systematic description of an animal's morphology. Linear scorers assess animals for muscle, skeletal and functionality traits.

Herd owners participating in the GENE IRELAND progeny test program are required to make their herds animals available for linear scoring and weight recording.



Pedigree herds should score all animals.

Animal should be scored between 150-250 days with all eligible animals made available for scoring when the linear assessor is on-farm. Where a minimum group of 5 is not available at the time of scoring this information may be omitted from genetic evaluations.

See page 23 for information on management practices that should be avoided and page 26 for further information on the service and how to access it. ICBF currently notifies breeders by text of pedigree animals eligible for scoring between 217 and 230 days of age.

4.2.8 Cow docility and milkability survey:

A survey is sent out once a year which is to be completed and sent back to Irish Cattle Breeding Federation as soon as possible and not more than 21 days of receiving the survey. The survey allows breeders to rate their females for milk yield and temperament. The temperament of breeding females should be recorded preferably at the time the animals are being weighed. See Figure 4, page 18 for further information.

Further data recording is required if any of the following procedures are used in the herd:

4.2.9 Flushing & Embryo transfer (ET):

If you are engaging in ET work with your animals it is important that you make contact with the relevant Breed Society and ensure that all flushing and embryo transfer details are recorded on the ICBF database. All information should be sent to the relevant Breed Society as soon as possible and not more than 21 days of the event. See page 28 for Breed Society Contact details.

4.2.10 Using imported stock bulls:

Anyone importing animals, semen or embryos from foreign countries should always:

1. Contact the relevant Breed Society here to ensure that the proper foreign ID is on the Irish database.
2. Contact ICBF to ensure that the relevant foreign breeding data (see Table 6, page 15 for further information) will be included in that animal's Euro-Star figures.

3. Ensure that the imported animal is performance recorded (Weighed, Scored, progeny tested etc) in Ireland so as the 'reliability %' figures increase as quickly as possible leaving the animal with as accurate an evaluation as possible.

4.2.11 Ultrasonic scanning (optional):

Ultrasound is an excellent tool for predicting carcass traits (meat, fat, and bone yield) for breeding animals that will not go for slaughter. It is used in genetic evaluations. Ultrasound should be carried out between 270 and 500 days of age. Eye muscle depth should be measured at the 3rd lumbar vertebra and fat depth at both the 3rd lumbar vertebra and 13th thoracic rib. Ultrasonic scanning is routinely carried out at Tully performance Test Center with a limited nationwide service available to breeders.

4.3.9 Missing Sires:

All animals with missing sires should be recorded where the sire of the animal is known. Contact a member of the HerdPlus team on (1850) 600900 for assistance.

4.4 Management of pedigree and commercial animals and poor data recording

The accuracy of indexes can be affected by inconsistent management practices of animals of similar age within a herd.

Management practices that are not advised because they may result in under and over prediction of Euro-Star Indexes within a herd include:

- 4.4.1 *Preferential treatment:*** This is a practice where a select group of animals from the herd receive a higher plain of nutrition from their contemporaries, thus distorting the genetics effects within the herd.

For example;

- a. An animal at birth has its dam intentionally switched for a female with higher milk yield in order to maximise the growth of the calf.
- b. A group of animals are fed a higher level of concentrates to their contemporaries of similar age.

- 4.4.2 *Linear scoring:*** Linear scoring is an important tool for assessing animals for muscle, skeletal and functionality traits. The following are examples of poor practice:

- a. Not weighing and scoring all eligible animals (150- 300 days of age) when the scorer is on-farm.
- b. Not informing the linear scorer at the time of scoring if management practices differ in the group of animals being scored. The scorer can record different management practices and allowances can then be made in genetic evaluations which will give breeders a more accurate index for their herd.
- c. Intentionally adding a poor quality animal to a selected group of animals with the goal of obtaining higher indexes for the other animals.

- 4.4.3 *Docility:*** Selection of animals based on their temperament has become an important trait in beef breeding. The following are examples of poor practice in recording docility:

- a. Over handling of selected animals within the group they are being compared too.
- b. The use of chemical agents to quieten animals at the time of scoring.

- c. Manipulating docility records in the Suckler Cow Welfare Scheme and optional cow survey.

4.4.4 *Incorrect farmer recorded data:* Irish Cattle Breeding Federation rely on correct recording of data by herd owners in order to accurately assess the genetic merit of a herd. Below are traits that must be recorded with a high degree of accuracy by herd owners (see page 20 for further information).

- a. Insemination records
- b. Registration of animals
- c. Suckler Cow Welfare Scheme data
- d. Cow docility and milkability survey
- e. Missing sires

5. GROW

Genetic Recording Of Weanlings

GROW is the name given to the ICBF service for recording on-farm cattle breeding information, on beef pedigree & commercial weanlings (sired by GENE IRELAND bulls). The service consists of two main areas:

1. *Weighing:* This involves obtaining the live-weight of an animal on the day the animal is linear assessed.

2. *Linear scoring:* Linear scoring by trained ICBF assessors involves assigning muscular scores on a scale of 1 (poor) to 15 (excellent) for locations that include width at withers, width behind withers, loin development, development of hind-quarters, width of hind-quarters and development of the inner thigh and skeletal scores (scale of 1 to 10) at locations that include length of back, pelvic length and height at withers. Functionality is also scored on a scale of 1 to 10 for locomotion, fore legs (front view), hind legs (side view) and hind legs (rear view).

5.1 Benefits of weighing and scoring cattle for pedigree and commercial animals (sired by GENE IRELAND bulls):

1. Get more accurate Euro-Star & figures for your herd.
2. Add value to your stock.
3. Make informed dietary decisions for your herd based on performance.
4. Get that edge at sales:
 - Pedigree cattle - Performance test stamp for your cattle in pedigree sales catalogues.
 - Commercial cattle - Green tag unique for heifers sired by GENE IRELAND bulls.
5. Make breeding & culling decisions based on the excellent management reports that you will receive after the Scoring & Weighing visit.
6. Identify genetics leaving the most profit within your herd.

5.1.1 Additional benefits for pedigree breeders:

1. Ensures your top bulls are identified for Tully & AI Centres.

2. Ensures your females qualify for Breed Society female qualification schemes.
3. Ensures you have Genetic Evaluations for your cattle on the new On – Line Herdbook.
4. Identifies strengths & weaknesses in your herd & makes use of your Breed Societies mating program.

5.2 What requirements must I meet to ensure that Scoring & Weighing will have a big impact on my Euro – Star figures?

1. All eligible animals **must** be Scored & Weighed at each visit.
 - Animals scored & not weighed will be excluded from the Euro-Star evaluations.
 - Eligible: All beef animals that are 150 – 300 days old with a known sire.
2. Group must have at least **5** animals **150 – 300 days old**.
 - Commercial cattle can be included with pedigree animals to make a group of 5.
 - Herds with less than 5 animals may still Score & Weigh for their own information but the smaller the group size the less impact the data will have on the BLUP & Euro – Star figures.
3. Maximum of **3** visits/year.

Table 7. Contact details for the linear scorer in your county

ICBF SCORERS								
Scorer	Counties							Mobile
John Beirne	Longford	Roscommon	Leitrim	Offaly	Westmeath	Sligo	Mayo	086-2742233
Basil Bothwell	Donegal	Cavan	Monaghan	Dublin	Louth	Meath		086-6050095
Lesley Sandes	Limerick	Tipperary	Clare	Galway	Kildare	Wicklow		087-6381199
Ger O'Brien	Laois	Wexford	Kilkenny	Waterford	Carlow			087-2379466
Clive Jennings	Cork	Kerry						086-2411399

- The Weighing Scales measures: 5ft 7" Long & 2ft 2" Wide.

Table 8. Cost of weighing and scoring

	Score	Weigh	Total
Pedigree	€ 6.00	€ 4.00	€ 10.00
Commercial	€ 2.50	€ 2.50	€ 5.00
Callout	€ 45.00		



Table 9. Optimum time to weigh cattle

GROW READY RECKONER	
Date of Birth	Weigh & Score
1st - 30th Sept	1st Feb - 30th Jun
1st - 31st Oct	1st Mar - 31st Jul
1st - 30th Nov	1st Apr - 30th Aug
1st - 31st Dec	1st May - 30th Sep
1st - 31st Jan	1st Jun - 31st Oct
1st - 28th Feb	1st Jul - 30th Nov
1st - 30th Mar	1st Aug - 31st Dec
1st - 30th Apr	1st Sep - 31st Jan
1st - 31st May	1st Oct - 28th Feb
1st - 30th Jun	1st Nov - 30th Mar
1st - 30th Jul	1st Dec - 30th Apr
1st - 31 st Aug	1st Jan - 31st May

Table 10. Gestation Chart

Gestation Chart											
Dates given are approximate											
Mated Jan	Due Oct	Mated Mar	Due Dec	Mated May	Due Feb	Mated Jul	Due Apr	Mated Sep	Due Jun	Mated Nov	Due Aug
1	11	2	10	1	8	1	10	1	11	1	11
2	12	4	12	2	9	2	11	2	12	2	12
4	14	6	14	4	11	4	13	4	14	4	14
6	16	8	16	6	13	6	15	6	16	6	16
8	18	10	18	8	15	8	17	8	18	8	18
10	20	12	20	10	17	10	19	10	20	10	20
12	22	14	22	12	19	12	21	12	22	12	22
14	24	16	24	14	21	14	23	14	24	14	24
16	26	18	26	16	23	16	25	16	26	16	26
18	28	20	28	18	25	18	27	18	28	18	28
20	30	22	30	20	27	20	29	20	30	20	30
	Nov		Jan		Mar		May		Jul		Sep
22	1	24	1	22	1	22	1	22	2	22	1
24	3	26	3	24	3	24	3	24	4	24	3
26	5	28	5	26	5	26	5	26	6	26	5
28	7	30	7	28	7	28	7	28	8	28	7
30	9			30	9	30	9	30	10	30	9
		Apr				Aug		Oct		Dec	
Feb		2	10	Jun		1	11	1	11	1	10
1	11	4	12	1	11	2	12	2	12	2	12
2	12	6	14	2	12	4	14	4	14	4	14
4	14	8	16	4	14	6	16	6	16	6	16
6	16	10	18	6	16	8	18	8	18	8	18
8	18	12	20	8	18	10	20	10	20	10	20
10	20	14	22	10	20	12	22	12	22	12	22
12	22	16	24	12	22	14	24	14	24	14	24
14	24	18	26	14	24	16	26	16	26	16	26
16	26	20	28	16	26	18	28	18	28	18	28
18	28	22	30	18	28	20	30	20	30	20	30
20	30		Feb	20	30		Jun		Aug		Oct
	Dec	24	1		Apr	22	1	22	1	22	1
22	2	26	3	22	1	24	3	24	3	24	3
24	4	28	5	24	3	26	5	26	5	26	5
26	6	30	7	26	5	28	7	28	7	28	7
28	8			28	7	30	9	30	9	30	9
				30	9						

5.3 Industry contact details

Breed Societies - Contacts				
Breed	Tel	Fax	Email	Web
Aberdeen Angus	071-9632099	078-32140	irishaberdeenangus@eircom.net	www.irishaberdeenangus.com
Irish Angus	071-9620253	071-9620406	angus@iol.ie	www.irishangus.ie
Aubrac	023-8833443	023-8834740	enquiries@ihfa.ie	www.ihfa.ie
Belgian Blue	0504-43870		belgianblue@eircom.net	www.ibbcs.com
Blonde d'Aquitaine	086-0743931	049-4367758	powerfulgenetics@eircom.net	www.irishblondesociety.com
Charolais	01-4198050	01-4080640	charola@iol.ie	www.charolais.ie
Danish Red	025-85036	025-85060	admin@irishlimousin.com	
Hereford	044-9348855	044-9348949	irishhereford@gmail.com	www.irishhereford.com
Holstein/Freisian	023-8833443	023-8834740	enquiries@ihfa.ie	www.ihfa.ie
Jersey	01-8240278		ggraham@tattersalls.ie	www.tasc.ie/jersey.html
Limousin	025-85036	025-85060	admin@irishlimousin.com	www.irishlimousin.com
Montbeliarde	051-641106		angela.lacey@deerparkfarm.com	www.montbeliarde.ie
MRI	064-42221		mrisociety@eircom.net	www.mricattle.org
Norwegian Red	025-85036	025-85060	admin@irishlimousin.com	
Parthenaise	057-9351811	057-9322025	turkeyds@hotmail.com	www.parthenaise.ie
Piedmontese	051-643503	051-643503	piedcattle@eircom.net	www.irishpiemontesesociety.com
Saler	0505-42245	0505-42245	irishsalers@eircom.net	www.irishsalers.com
Shorthorn	0504-26806		shorthornsoc@eircom.net	www.irishshorthorns.com
Simmental	057-9324577	057-9324596	simmental@eircom.net	www.irishsimmental.com
Speckled Park	021-4667207		irishspecklepark@yahoo.ie	www.irishspecklepark.com
Swedish Red	025-85036	025-85060	admin@irishlimousin.com	

AI Companies - Contacts			
AI Company	Tel	Email	Web
ABS	022 - 46030	slavery@genusbreeding.co.uk	www.genusbreeding.co.uk
Bova	061 - 351233	info@bova-ai.com	www.bova-ai.com
Celtic Sires	086 - 8810719	info@celticsires.com	www.celticsires.com
Dovea	0504 - 21755	info@dovea-genetics.ie	www.dovea.ie
Eurogene	052 - 7442940	info@eurogeneaiservices.com	www.eurogeneaiservices.com
NCBC - Progressive Genetics	1850 - 20-20-50	info@ncbc.ie	www.ncbc.ie
NCBC - Munster AI	022 - 43228		
Powerful Genetics	086 - 0743931	powerfulgenetics@eircom.net	www.powerfulgenetics.com
Sligo AI	087 - 7477099	info@sligoai.com	www.sligoai.com

5.4 References:

Berry, D. Genomic selection for Irish beef cattle – the basics. Downloaded on 6-3-2012 from

http://www.agresearch.teagasc.ie/grange/genomic_selection.asp.

ICAR- Recording guidelines 2011. Downloaded on 6-3-2012 from

http://www.icar.org/Documents/Rules%20and%20regulations/Guidelines/Guidelines_2011.pdf.

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