Making Greatest Use of Beef Breeding Indexes – Sire & Dam information.

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Introduction.

Recent trends from the ICBF database have indicated a 4.1% drop in the number of Suckler beef cows with a calving on an annual basis (Table 1). More worryingly is the drop in beef heifer calvings (down 9.3%/year) and increase in beef cows being culled (up 13%/year) over the same 3 year period. Addressing this rate of decline and ensuring a profitable suckler beef industry is one of the key objectives of ICBF.

Table 1. Trends in Suckler Beef Numbers over the past 12 months*

	2007/2008	2008/2009	2009/2010	Change/year
Beef cows with a calving during 12 mths	1,009,212	968,660	885,647	-4.1%
Beef heifers with a calving during 12 mths	188,026	166,939	135,665	-9.3%
Beef cows culled during 12 mths	133,303	161,797	186,865	13.4%

* 12 month period is from 1^(st) July to 30^(th) June in given year.

In this paper we will attempt to identify how beef breeding indexes can help to improve the profitability of our Sucker beef herd and in doing so, identify some areas that require particular focus, if we are to build a sustainable and profitable Suckler beef industry in the future.

Understanding Beef Breeding Indexes.

The Suckler Beef Value (SBV) was first introduced in 2007 and indicates the expected profit (€) per progeny from a breeding animal (male or female). It is made up of various sub-indexes including; weanling, carcass, daughter milk and daughter fertility. A quick summary of each index is given in Table 2.

Table 2. Overview of key indexes.

Index	Description
Suckler Beef Value (SBV)	This is a measure of the overall beef value of an animal.
Weanling Export	The ability to produce profitable weanlings.
Beef Carcass	The ability to produce profitable carcasses.
Daughter Fertility	The ability to produce daughters with good fertility.
Daughter Milk	The ability to produce daughters with good milk production.

In the process of genetic evaluation, data is collected from Irish beef farms, marts and factories on each individual anima (indeed current evaluations are based on analysis of over 4 million records from these sources). Non-genetic effects such as age, sex, breed and herd management are then corrected for to give an indication of the animals genetic merit for key traits such as carcass weight, weaning weight, calving difficulty, cow milk, cow fertility (some 40 traits in total are evaluated on each animal). These traits are then summarized into the various profit indexes outlined above. Thus an animal with an SBV of €150 is expected to leave an additional profit of €150 per progeny compared to a bull with an SBV of €0. Animals will have strengths and weaknesses in different areas and this is then reflected in their various sub-indexes.

Reliability figures are also published with each index, indicating the amount of confidence that a person can have in the index. Stock bulls and females generally have reliability figures of around 30-50%, indicating that the animals proof could change by +/- €80, as more information becomes available. In contrast AI bulls generally have reliability figures of around 70%, indicating that the animals proof could change by +/- €40, as more information becomes available.

In addition to the €value figure for SBV and each sub-index, all animals are also ranked on the basis of stars (or €uro-Stars) into 5 categories, based on % rank within the breed, with 5 stars indicating top 20% for the trait, and 1 star indicating bottom 20% for the trait. The benefits of the star rating is that they quickly allow a farmer establish where an animal is strong or weak. For example, a breeding bull could be 5 stars for overall SBV (top 20%), but only 2 stars for a trait such as maternal milk. This shouldn't surprise as the animal that has everything is often very hard to find!

Do €uro-Stars work?
One of the first questions asked by farmers and breeders is whether the new €uro-Star indexes work? For example, if he buys a bull based on €uro-Star indexes, how confident can he be that the bull will deliver progeny that leave more profit at the time of sale, than a bull with no information or only average values?

Some recent work by ICBF has clearly demonstrated the value of €uro-Stars (Table 3). For example, of the 6,191 steers slaughtered during the week ending 1st February 2011 (with carcass index values), 1,067 were 5 star steers and 1,282 were 1 star steers (the progeny of high and low index bulls). A comparison of slaughter performance for these animals indicates that on average 5 star animals were 74 kg heavier in terms of carcass weight (at about the same age), had better conformation (by 3 conformation points) and had an increased carcass value of over €300 compared to 1 star animals.

Table 3. Beef cattle prices for week ending 1st February, based on carcass index value.

	1 Star	2 Star	3 Star	4 Star	5 Star	Diff (1 vs 5)
Number animals	1282	1394	1276	1172	1067	
Age (months)	29.0	29.8	30.7	29.6	28.8	-0.2
Carcass weight (kg)	343.6	375.7	396.1	403.7	417.5	73.9
EU Grade & Fat Score	O+3+	R=3+	R=3=	R+3=	R+3=	3 pts
Price (€/kg)	3.31	3.39	3.44	3.47	3.45	0.14
Lifetime Gain (kg/day)	0.34	0.37	0.38	0.4	0.43	0.09
Value (€)	€1,137	€1,275	€1,362	€1,400	€1,439	€301
Carcass Sub Index (€)	-€16	€16	€37	€53	€77	€93

Similar trends are apparent for other categories of animals (e.g., heifers, young bulls and cull cows) and for animals traded through marts. The bottom line is 5 star animals deliver more profit at the time of sale than animals of average or low genetic index. The evidence is therefore compelling. When buying a bull or selecting AI straws this spring, farmers should focus on the €uro-Star values, as they will result in increased profit for their farming businesses.

Using indexes to select females?
Whilst the indexes are generally acknowledged as an accurate tool on which to select breeding bulls for weanling and carcass traits, do the same principles hold for maternal traits, e.g., maternal milk and daughter fertility performance? This is especially relevant given the much lower reliability figures for these data (typically only 5-10% for stock bulls). Furthermore, this issue prompts the related question, as to whether Suckler beef farmers can use the €uro-Star indexes to try and identify maternal beef replacements.

To help answer this question, ICBF have recently undertaken an analysis of fertility performance from over 12,000 ½ and ¾ bred beef heifers, that were born on commercial farms in Spring 2006. In evaluating the usefulness of genetic indexes, we asked 5 relevant questions.
- What % of the original animals had calved at 2 years of age?
- What % of the original animals had a 2nd calving within 390 days of the first?
- What % of the original animals had 3 calves and were still alive on these farms by February 2011?
- What were the differences in fertility performance between ½ and ¾ bred beef females?
- What influence did €uro-Star rating for fertility index have on animal performance?

Results from these analysis are given in tables 4 & 5.

Table 4. Fertility performance of ½ bred beef heifers, born Spring 2006, based on fertility index.

Fertility Index	1 star	2 star	3 star	4 star	5 star	All
Number animals	1524	1525	1525	1525	1524	7623
% calved at ~24 mths	22.9%	28.2%	32.8%	37.4%	46.6%	33.6%
Average age at 1st calving	31.3	30.5	29.8	29.2	28.4	29.8
% with CI<390 days (1-2)	27.5%	36.7%	41.2%	46.0%	57.0%	41.7%
Average CI Days	435.3	425.2	418.9	410.2	391.6	415.1
% alive & with 3 calves	13.3%	20.5%	25.1%	30.8%	44.8%	26.9%
Average number calvings	1.81	1.95	2.03	2.13	2.34	2.05

Table 5. Fertility performance of ½ bred beef heifers, born Spring 2006, based on fertility index.

Fertility Index	1 star	2 star	3 star	4 star	5 star	All
Number animals	880	880	880	880	880	4400
% calved at ~24 mths	23.0%	29.0%	34.0%	39.0%	48.0%	35.0%
Average age at 1st calving	31.9	31.3	30.3	29.7	28.8	30.4
% with CI<390 days (1-2)	26.0%	32.0%	39.0%	43.0%	51.0%	38.0%
Average CI Days	435.1	422.0	414.5	404.3	397.7	413.6
% alive & with 3 calves	11.0%	19.0%	25.0%	28.0%	42.0%	25.0%
Average number calvings	1.77	1.92	2.06	2.09	2.27	2.02

Results presented in the above tables clearly demonstrate the value of €uro-Star indexes as a means of improving fertility performance on Irish beef farms. On average, some 43% of 5 star females were still on farms and had 3 calvings by February 2011, compared to only 12% for 1 star females. Similar trends are apparent for both calving at 24 months and re-calving within 390 days. Furthermore, the results are consistent for both ½ and ¾ bred females, with little difference

in fertility performance between both of these groups of animlas. These results clearly demonstrate the value of using the €uro-Star indexes as a means of improving maternal efficiency on Irish beef farms.

Current areas of focus.
Data from the above tables has clearly demonstrated the value of breeding indexes as a means of improving the profitability of our beef industry. However, these points are often not readily acknowledged within the beef industry. To try and address these issues, ICBF and Teagacs are working closely together on a number of initiatives to help increase confidence in beef indexes and also further improve the accuracy of our beef breeding systems These include;
1. *Research and demonstration farms.* The Grange Derrypatrick herd is currently being expanded to consider additional traits (e.g., maternal milk and fertility) and breeds (including ½ bred females from the traditional breeds) as part of its widened research agenda. This is a most welcome development and reflects a strong desire to identify the most profitable beef cow for Suckler farmers in the future. Doing this will require accurate recording of these females (at Grange), as well as females from "linked" demonstration farms, e.g. the BETTER farms program.
2. *New maternal indexes for commercial beef farmers.* ICBF are currently working on a new maternal index, which will help Suckler beef farmers identify the most suitable animals for retaining as maternal replacements and those that should be sold for slaughter. The index will have increased weighting on maternal milk and daughter fertility traits (compared to the Suckler Beef Value) and will be available in Autumn 2011.
3. *Improvements to maternal evaluations.* In addition to new indexes, ICBF and Teagacs are also working on improvements to maternal evaluations. This includes the use of insemination and additional calving data in the evaluation of daughter fertility and the use of cow milk scores (as collected recently by farmers through the SCWS) in the evaluation of maternal milk. Both of these pieces of work are nearing completion and are expected to show strong positive effects on the accuracy of evaluation for these important traits.
4. *New weight recording services.* At this stage, only a small number of commercial (and pedigree) beef farmers weigh their cattle on a regular basis. This is in contrast to dairy farmers, where milk recording is seen as an integral part of their farming business. ICBF are currently undertaking a review of its weight recording service, with the objective of increasing the level of weight recording, through a wider range of service options. It is anticipated that these service options will range from DIY recording (where the farmer owns &/or shares a set of scales with other farmers), to a fully integrated service where the farmer can get the equipment and access to an on-farm technician. Part of this new service will also include a new set of performance recording reports, which will support decision making on the farm. Again it is anticipated that elements of this new service will be available in Autumn 2011.
5. *Genomics.* Genomics has revolutionised dairy cattle breeding, with an almost doubling of rates of EBI gain, since the introduction of this technology in 2009. Similar opportunities now exist in beef breeding. Indeed Ireland is very well positioned to capitalise on the potential benefits of genomics through having; (i) accurate data on which to base the predictions (as evidenced earlier), (ii) access to DNA for AI and stock bulls, (iii) the necessary skill set to undertake the required research and (iv) an industry structure that can facilitate swift uptake in the technology. One of the constraints to the current research work is having the required funding to undertake the genotyping of historic animals. Over

the next few months, ICBF will be working with relevant industry partners to secure these funds and hence commence this work on behalf of Irish beef farmers and the wider beef industry.

Summary.
There has been huge progress in Irish beef breeding over the past 5 years. Indeed our data recording and genetic evaluation systems are amongst the most comprehensive of any of the major beef producing countries. Recent analysis of data from commercial herds has clearly demonstrated the value of beef breeding indexes as a means to improve the future profitability of our beef industry. This, coupled with ongoing developments such as genomics and new maternal indexes, will result in further improvements in the future and to an even more sustainable and profitable beef industry in the future.