Beef Data & Genomics Program (BDGP):

ICBF's Top 10 Most Frequently Asked Breeding Questions Answered

Q1. Do the €uro-Star indexes work? Are ICBF confident that by selecting females on the replacement index, that farmers will improve maternal efficiency?

Yes. Work by ICBF and Teagasc has clearly demonstrated the link between the €uro-Star replacement index and maternal female performance. The objective of the index is to identify animals that will have good milk and fertility and with a good calf at foot. Latest analysis of data from the Teagasc Grange Maternal herd (some 109 animals, selected based on €uro-Star replacement index in Autumn 2012), indicates that, using that index, the high genetic merit animals are clearly more profitable than their low genetic merit contemporaries, based on completed first lactation performance (Table 1).

Table 1. Summary of performance from Teagasc Grange Maternal Herd.

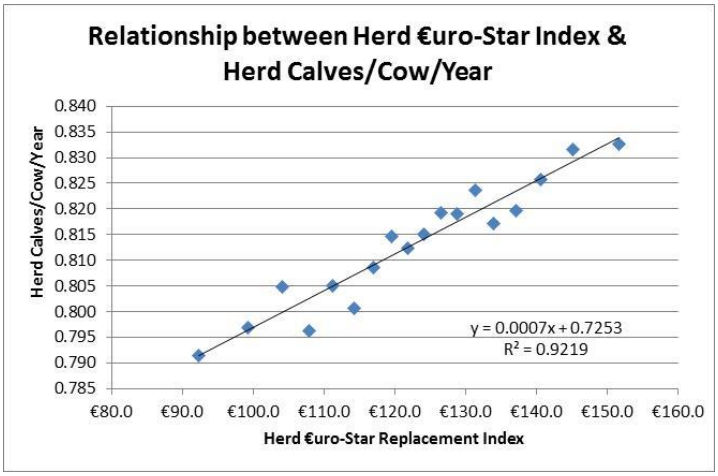
	High Replacement Index	Low Replacement Index
Age at 1st calving (days)	752	769
Calving (date)	16 March	29 March
Cow weight at calving (kg)	511	522
Weaning weight (kg)	261	255

The short summary of the data from Table 1 indicates that selecting animals in Autumn 2012 based on their €uro-Star replacement index has resulted in cows that calve earlier, are lighter at calving, but yet rear a heavier calf. These are exactly the sort of attributes that we want to see in our suckler cow.

Q2. What are the high level objectives of the scheme? What will it actually deliver?

The objectives of the scheme is to increase the average €uro-Star replacement index of herds through the introduction of more 4 & 5 star animals (bulls and cows) in scheme herds. Again, work by ICBF and Teagasc has clearly shown the direct relationship between increasing herd replacement index and key industry metrics such as calves/cow/year and suckler cow profitability (Figure 1). This analysis was based on some 24k herds that were in the 2014 program that had 10 or more calvings in 2014.

Figure 1. Relationship between Herd €uro-Star Index and Herd Calves/Cow/Year.



Analysis of that dataset has indicated that moving herds in the scheme from €120 on herd replacement index (i.e., 38% 4 & 5 star females, the average for the dataset) to €145 on herd replacement index (i.e., 57% 4 & 5 star females), will result in calves/cow/year increasing from 0.81 to 0.83, resulting in another 3 weanlings being generated on scheme farms during the course of the program (on an average 20 cow farm). Cumulatively this is worth some €1200 at the farm level, or some €35m for all herds involved in the scheme. There will be other benefits from participating in the scheme, through the use of better terminal sires, in addition to improved maternal efficiency. The net effects of these terminal gains are equantified to be €2000 per 20 cow herd (on top of the €1200 maternal gain from above), resulting in an overall net gain from the scheme of some €3200 (over the 6 years). This equates to an additional €30/cow/year, on top of the scheme payment of some €90/cow/year. Of course, participants should be reminded that the benefits of improved genetics won't simply stop once the scheme finishes in 2020, and on that basis DAFM and ICBF are confident that benefits of the scheme will continue to accumulate over many years in the future, with a quantified total value of €300m by 2030, based on improved maternal traits alone.

Q3. What actions will farmers have to undertake in relation to the scheme. What's new compared to the 2014 scheme?

The key actions that farmers will have to undertake in relation to the scheme are; (i) data recording, (ii) genotyping, (iii) replacement strategy, (iv) carbon navigator, and (v) training. The data recording and genotyping actions are very similar to the 2014 scheme, except that in the context of the new scheme, there will be an increased level of genotyping (60% of the number of suckler cows calved in the herd in 2014, to be genotyped in each of the 6 years of the scheme). This is to help ensure that, going forward, we maximise the availability of potential replacement 4 & 5 star genotyped females for the purpose of the scheme. The replacement strategy requirement is also new, but is crucial in the context of helping achieve the scheme objectives. That is an increase in the average replacement index of participating herds over the duration of the scheme. The carbon navigator and training components are also new, and will have to be undertaken in consultation with trained personnel during the first 18 months of the scheme (prior to October 2016).

Q4. What €uro-Star ratings do my cows have? Where can I find this out?

Herd-owners should not worry unduly regarding the current €uro-Star Index of their herd, as the whole objective of the scheme is to improve these attributes over the 6 year duration of the scheme (and

beyond). Of course, once a herd-owner has applied and is enrolled into the scheme, then DAFM (& ICBF) will inform all herd-owners of the status of their herd regarding its €uro-Star indexes. This will then be updated on an annual basis as the scheme progresses. This initial picture of the herd will also form part of the training for the 6 year scheme, so that herd-owners can develop a clear replacement strategy that is specific for their herd. DAFM and ICBF are confident that if herd-owners adhere to this policy, then the maternal efficiency of their herd will improve (as per the scheme objectives) – and that they will meet the compliance requirements set out within the scheme regarding number of 4 & 5 star replacements by 2018 (20%) and 2020 (50%).

Q5. It will not be possible for me to meet the replacement index requirements of 20% 4 and 5 star replacement females by 2018 and 50% by 2020.

This is incorrect. Analysis undertaken by ICBF of the 2014 program (based on 35k herds involved in the 2014 program) has indicated that, some 30% of herds are already compliant with the 2020 replacement female requirement and 52% are compliant with the 2018 requirement. Of course there will be some herds, with very low replacement indexes, that will require a change in their breeding strategy, either through the use of high replacement index AI sires (€200+) or through the purchasing in off suitable replacement females. However, this is exactly why the program exists, to promote a change in suckler cow breeding strategy on Irish beef farms. This will be dealt with in detail during the training part of the scheme. Applicants should not be deterred by this issue; rather it should be seen as an opportunity to improve your suckler herd replacement strategy.

Q6. What are the benefits in getting involved in the beef genomics scheme from a pedigree beef breeding perspective?

There are many benefits to getting involved in this new beef genomics and data program including; (i) your pedigree animals (males and females) will be genotyped as a part of the scheme, with the cost of genotyping then netted off your scheme payment. Indeed analysis by ICBF has indicated that of the 5,000 pedigree beef herds in Ireland, 90% would have all of their pedigree young-stock genotyped as part of the scheme, at no additional cost to themselves. The total cost of this genotyping is €1m/year or €6m over the full course of the scheme. Not only will this further help identify suitable pedigree males for the program (see below) and replacement females for your herd (including potential surplus replacements for sale), it will also serve as a vital insurance factor for breeders in relation to confirmed pedigree status for all animals in the future (i.e., pedigree breeders will have DNA verified status on all pedigree young stock going forward in the future as a result of the scheme), (ii) scheme herds will require genotyped 4 and 5 star bulls over the 6 years of the program (some 7k bulls/year). These will be provided by the pedigree breeders participating in the scheme, otherwise breeders will have to pay for the cost of genotyping themselves, with the current cost of genotyping a male animal being €50 and (iii) pedigree breeders have taken the leadership on many initiatives in the past. For example, 80% of breeders were involved in the 2014 program. It is vital that we increase this further in the 2015 – 2020 program, if we are to ensure that the maternal efficiency of the Irish suckler herd is to be improved in the future.

Q7. There will not be enough pedigree bulls with the required indexes to make the scheme work?

Again, this is incorrect. Analysis undertaken by ICBF has clearly highlighted that of the 14k pedigree bulls born each year, approximately 10k will be eligible (i.e., are in the top 40% for either replacement index or terminal index, on a within or across breed basis). Furthermore analysis from the 2014 program has

indicated that the number of new breeding bulls required in scheme herds is some 7k/year (the average length of productive life of a pedigree bull is 3.5 breeding seasons). Therefore, there will be more than enough pedigree bulls to cater for the requirements of the program. Bull breeders or commercial farmers do not need to be afraid that there will be a shortage of bulls for the scheme.

Q8. There are not enough suitable 4 & 5 star bulls for pedigree use, to breed the required stock bulls for the industry.

Again, this is incorrect. There is a very wide range of AI bulls available for pedigree beef breeding that are 4 or 5 stars on either the replacement or terminal index. For example, ICBF recently completed its listing of recommended sires for bull breeders involved in the G€N€ IR€LAND maternal beef breeding program (Table 2). In total there are some 164 bulls in that catalogue (http://www.icbf.com/wp/wp-content/uploads/2015/05/Gene-Ireland-Recommended-Sire-List-2015.pdf) of which 151 (92%) are 4 or 5 stars on either the replacement or terminal index (within or across breeds).

Table 2. Overview of bulls listed in the G€N€ IR€LAND Maternal Recommended Sire List (Spring 2015).

Breed	Total Bulls Listed	Qualify on Rep Index Only	Qualify on Rep and/or Ter Index
Angus	19	14	16
Aubrac	3	3	3
Blue	12	9	10
Blonde	3	3	3
Charolais	39	39	39
Hereford	15	11	12
Limousin	25	25	25
Parthenais	10	4	10
Saler	7	7	7
Shorthorn	15	8	10
Simmental	16	16	16
Total	**164**	**139**	**151**

Looking at the listing indicates that, of the main breeds there are 39 Charolais bulls (all eligible), 25 Limousin bulls (all eligible), 19 Angus bulls (84% eligible), 16 Simmental bulls (all eligible) and 15 Hereford bulls (80% eligible). This simply serves to highlight that the challenge is not necessarily sufficient bulls, but rather establishing a mindset change regarding the type of bull that will be required in the future to breed the next generation of stock bulls. Traits such as cost of calving, cost of maternal efficiency and cost of feed/maintenance will become increasingly important, as our suckler herd competes with other sectors for resources (land, labour and capital).

Q9. The scheme will restrict the use of "outcross" sires by pedigree breeders.

Again, this is incorrect. The scheme caters for the use of outcross sires, as the 80% compliance requirement on AI gives more than enough scope for pedigree breeders that wish to use some outcross sires as part of the scheme. Indeed, recent analysis undertaken by ICBF has also indicated that the problem is not as large as some people might consider. For example, there were 166 new beef AI sires coded last year (both Irish bred and foreign) and of these, 69% are already compliant with the scheme. ICBF fully expects that one of the positive aspects of the scheme will be that AI companies and breeders will be much more vigilant regarding the type of "outcross" bulls that they purchase/import in the future

and that this figure (69%) will increase significantly in the next 1-2 years. This would be a positive outcome for the Irish beef industry.

Q10. The €uro-Star index figures are often meaningless due to the low levels of data reliability associated with them. What is the trade-off between data reliability and stars?

Attached to every €uro-Star index is a data reliability figure. Taking an example from Table 3, this means that if a farmer was to buy a stock bull with a €uro-Star index of €140 on replacement index (i.e., 5 stars on the replacement index), then, at the extremes (95% confidence levels) his index could increase (or decrease) by some €100. For an AI sire (i.e., 90% data reliability) the figure reduces to €38, which helps to highlight the benefits of using AI when breeding female replacements.

Table 3. Impact of reliability and number of animals on change in €uro-Star replacement index.

	Reliability for €uro-Star Replacement Index.							
Number of Animals	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.95
1	100	93	85	76	65	53	38	27
2	71	65	60	53	46	38	27	19
3	58	53	49	44	38	31	22	15
4	50	46	42	38	33	27	19	13
5	45	41	38	34	29	24	17	12
6	41	38	35	31	27	22	15	11
7	38	35	32	29	25	20	14	10
8	35	33	30	27	23	19	13	9
9	33	31	28	25	22	18	13	9
10	32	29	27	24	21	17	12	8

As indicated earlier, one of the key objectives of the scheme is ensure that all breeding animals will be genotyped as part of the scheme. Based on experience from dairy, we expect this to increase the average reliability for replacement index for animals in the program from the current 30% (for replacement index) to 50% during the course of the scheme, which will result in a reduction in the potential change in a single animals proof from the current €100 (1 animal at 30% data reliability) to €85 (1 animal at 50% data reliability), through the use of additional DNA data. Of course another way for farmers to reduce the risk associated with data reliability is through using teams of AI bulls when breeding female replacements, which is exactly the approach taken by farmers participating in the G€N€ IR€LAND beef breeding program, operated by ICBF on behalf of the beef breeding industry. In that program, beef farmers generally use a team of 4 young beef bulls, which reduces the average change in bulls proofs (for the team) from €100 down to €50. Using a team of 4 genomically selected young bulls at 50% reliability, would reduce the range to €42.

Of course the exact same exercise undertaken above for bulls, is equally (and arguably even more relevant) in the context of breeding females. In this circumstance, farmers participating in the scheme, will, on average, be bringing in at least 10 replacement females over the course of the scheme (i.e., 20 cow herd, bringing in 2 new replacement females/year). Again all of these animals will be genotyped, with a genomic reliability of 50%. As a result the expected change in proofs for these animals (across all 10 female replacements) is expected to be only €27, which serves to highlight why the scheme is so

focused on using new technology (i.e., €uro-Stars, genomics and teams of animals) to support breeding strategy on participating farms.

Genotyping and Replacement Requirements

The following table (Table 4) details the various requirements for different herd sizes, based on the number of calved suckler cows in 2014. 2014 will be the reference year, for all herds, for the duration of the program.

Table 4. Requirements for different herd sizes.

Suckler Cows Calved in 2014	Number of animals to be genotyped in each year of program	Number of 4 & 5 star genotyped females required in 2018	Number of 4 & 5 star genotyped females required in 2020
10	6	2	5
15	9	3	8
20	12	4	10
50	30	10	25
75	45	15	38
100	60	20	50
150	90	30	75
200	120	40	100