Change in ICBF evaluations for GROW® linear scored MUSCLE and SKELETAL composites

Current situation

Currently ICBF perform routine evaluations for within breed BLUP Muscle and Skeletal composites. These evaluations are run every two weeks and are separate evaluations for the Charolais, Limousin and Simmental breeds and only include pedigree animals of these breeds.

The only rule for inclusion of an animal in the current BLUP evaluations are that the animal must be scored between 3 and 28 months (Charolais), or between 5 and 30 months (Limousin and Simmental). All animals scored are included in the evaluations including herd visits where a single animal is scored.

The current BLUP system has a number of limitations which had to be addressed:

1. The age range at which animals were scored is too wide and thus affects accuracy of proofs.

2. Linear score information where a single animal is scored in a herd visit is also used by grouping all the animals in these single scoring sessions into a single herd over a period of time thus assuming similar management practises across all these herds which is a large assumption.

3. The current system accounts for age on a calendar month basis, thus potentially penalising animals scored late in a calendar month unfairly. Since the development of the current BLUPs better ways of accounting for age have been developed.

4. The system only uses information on pedigree animals whereas many herds have also got crossbred animals which could also provide valuable information.

5. The current evaluation only provides genetic indexes on the composite traits for MUSCLE and SKELETAL. Hence breeders do not see the individual trait strengths of the animal scored such as loin development or development of hind quarter which are 2 of the 5 traits in the MUSCLE composite.

6. The current BLUP evaluation is not based on a similar level of evaluation criteria as the €uro-star indexes and is not in tandem with the timing of release of the €uro-star indexes.

7. The current system is only available for 3 breeds.

8. There is no facility to compare across breeds for commercial herd owners requiring this information.

In order to address these issues a number of changes were needed to scoring rules. Over the last few years ICBF and the breed societies through the **GROW®** service have been encouraging breeders to follow 3 basic rules in order that the data recorded is of optimum use for genetic evaluations;

a) Weigh all animals
b) 150-300 day age range
c) In a group of at least 5

The reason for the weighing is to get an accurate estimation of growth traits but also an estimation of the milkability of the dam, both which can be estimated from a measure of weaning weight. In addition to the weighing, the linear scored traits then allow estimation of genetic differences in animals for the muscle and skeletal traits measured, thus providing a much more comprehensive analysis of the animal than just scoring alone. In terms of the move to younger age at scoring, more differences in management and feeding regimes will also occur post weanling (over 300 days) which compromises an evaluations ability to accurately estimate the genetic merit of the animals scored.

A new genetic evaluation system in line with the new scoring rules has been developed to address all the 8 issues/limitations outlined above. In line with this development a new pedigree sales catalogue for premier sales has also been developed which will incorporate the new changes and reward breeders following best practise in relation to linear scoring and weighing.

The new rules to be applied for an animal to make it into the new evaluation are as follows:

Evaluation rules:
1. Animals must be scored & weighed in a group of 5 (may include commercials) and must be at least 150 days of age and less than 300 days of age for their information to be included in the €uro-Stars and linear type trait evaluations.
2. The sire of all the animals in the scoring group must be known.
3. Animals submitted for scoring which were purchased (not born in the herd) must be on the farm for a minimum of 2 months prior to scoring.
4. Only animals out of a beef breed of sire will be accepted.
5. Animals with a condition score of 1 (scale from 1 to ten) will not be used in the evaluation as this is an indication the animal is malnourished or sick. The variation in condition score within the group of animals scored will also be examined by the scorer to ensure no extreme preferential treatment is carried out.
6. Information relating to the ancestry of animals will be updated in the evaluation once every 4 months along with the routine €urostar evaluations. Hence breeders need to ensure the pedigree details are correct at or before the time of scoring.
7. Evaluations will be run once a month
8. For each monthly evaluation the cut-off date after which animals scored will not be included will be 15th day of the month.
9. New evaluations for linear and €uro-Stars will be available on the 1st week of the following month

Publication rules for catalogues at PREMIER pedigree sales:

Table 1. Evaluation inclusion and Publication rules applying to the new GROW® evaluation

| | Inclusion rules for new GROW evaluation | | | | Publication rules | | | | |
| | | | | | €uro-star SBV proofs | | GROW Bar graph and composites | | Type of proof (where proof is shown) |
	Was the animal scored?	Was animal in age range 150 to 300 days ?	Was the animal scored in a Group of 5 ?	Was a group of 5 possible in 150-300 day range	Premier Sales catalogues	ICBF website	Premier Sales catalogues	ICBF website	
Category 1	yes	yes	yes	yes	√	√	√	√	Own performance included
Category 2	yes	yes	no	no	√	√	√	√	Parental Average
Category 3	yes	yes	no	yes	√	√	√	√	Parental Average
Category 4	yes	no	yes	yes	√	√	√	√	Parental Average
Category 5	no	-	-	no	√	√	X	X	Parental Average
Category 6	no	-	-	yes	X	√	X	X	Parental Average

Note: Animals in Category 1 will have their scores included in the €uro-star and linear evaluation as they meet all the criteria. Animals in Categories 2 to 4 will receive a parental average €uro-star, a parental average bar graph and a parental average composite for Muscle, Skeletal and Composite indexes. Animals in Category 5 will receive a parental average €uro-star where they have not been scored in a situation where a group of 5 was not possible. Animals in Category 6 will receive no indexes in a sales catalogue in a situation the animal was not scored and where a group of 5 would have been possible.

Example herd

An example of a herd with 6 animals for scoring is shown in Table 2. The age range from the oldest to the youngest is 159 days. This will mean that the breeder will only get 5 of the 6 animals scored in the age range no matter when he scores between the 15th January and the 25th January. As a result he has to decide whether to score Animal 1 or Animal 6. To score Animal 1 in a group of 5 he has to score on or before 15th January. To score Animal 6 in a group of 5 he has to score someday between 20th January and 25th January. In this case the breeder should score on or before the 15th January and score Animals 1 to 5. While it would be possible for Animal 6 to get into a group of 5 on the 25th January the other four animals eligible (Animals 1 to 5) will already have been scored on the 15th and thus Animal 6 will fall into **Category 2** (if Animal 6 is scored on his own after the other animals have been scored on 15th January). In this case the breeder could not have got a group of 5 for Animal 6 and in this case he will receive parental average indexes.

If the breeder decided to score the 3 oldest animals on 15th January and the 3 youngest animals on the 25th January then neither group will qualify for the evaluation as both groups will be less than 5. All six animals will then fall into **Category 3**.

If on the other hand the breeder did not score any of the 6 animals then all 6 animals will fall into **Category 6** and he will not have figures published in the sales catalogue.

Table 2.

	age on 15th January	age on 25th January
Animal 1	299	309
Animal 2	289	299
Animal 3	240	250
Animal 4	220	230
Animal 5	200	210
Animal 6	145	155

A diagrammatic representation of the new traits is shown in Figure 1 and examples of the new information which will be provided to breeders as part of a revamped sales catalogue is shown in Figures 2, 3 and 4.

The bar graph of individual GROW® traits will only be shown for animals that have been scored and weighed. Only animals that meet the criteria of the new rules will have their linear score and weight information included in the €uro-stars and GROW® evaluations. Animals scored and not meeting the criteria will get parental average €uro-stars and GROW® evaluations.

With regard to the new bar chart the individual traits are grouped in accordance with the index they are part of:

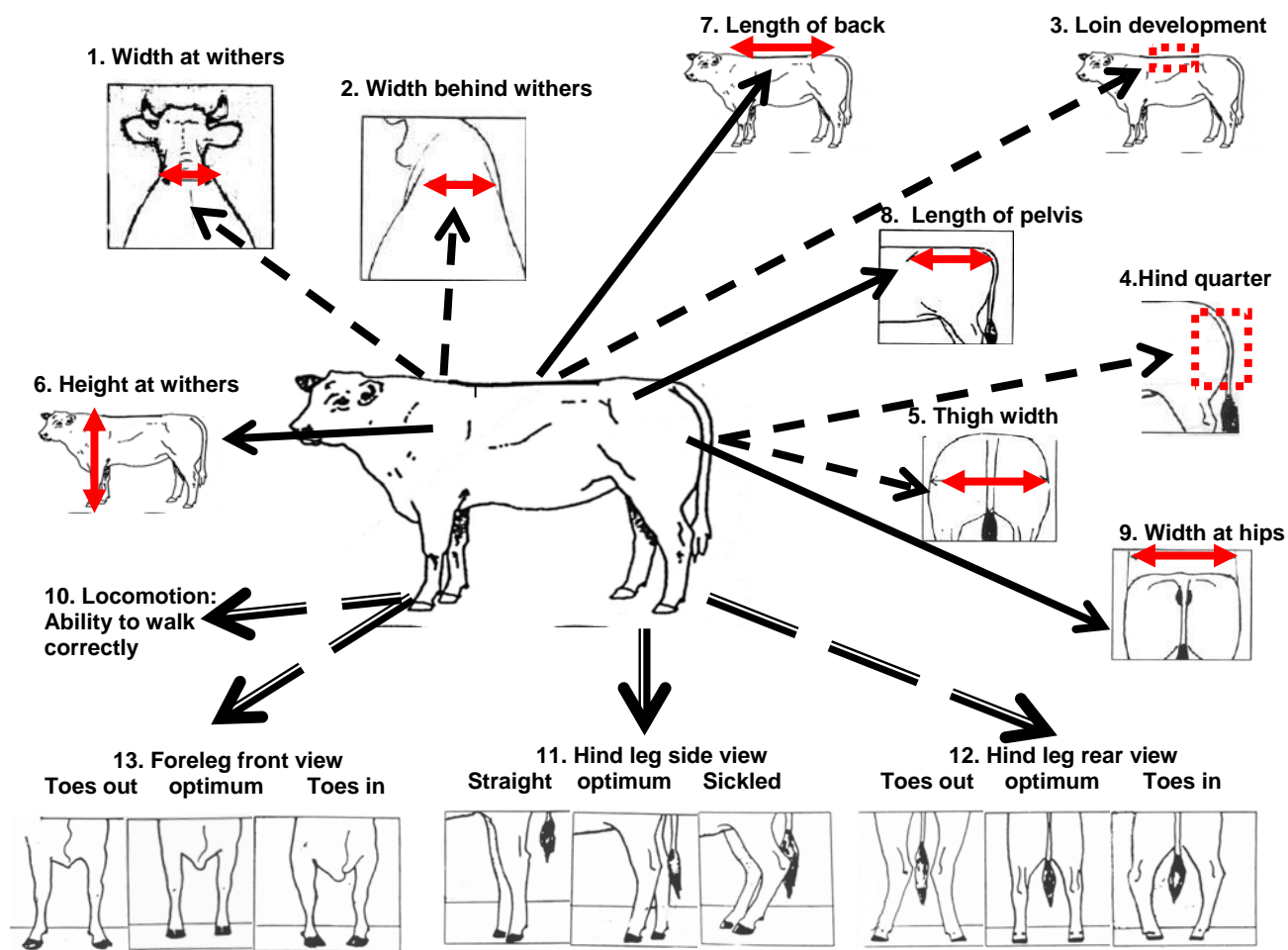| **MUSCLE composite**	**SKELTAL composite**	**FUNCTIONAL composite**
Width at Withers	Height at withers	Locomotion
Width behind Withers	Length of Back	Hind-leg side view
Loin development	Length of Pelvis	Hind-leg rear view
Development of Hind Quarter	Width at Hips	Fore-leg front view
Thigh width		

On the bar graph in sales catalogues these individual traits will be expressed within breed and the percentile bands are based on the genetic merit of animals scored in the breed in the last 5 years. Similar to the previous BLUP and the €uro-star SBV indexes these bar graphs give the purchaser an indication of the type of progeny that the animal is likely to breed and are designed to be more of a reflection of the type of progeny the animal will produce rather than the way the bull looks himself.

However the indexes on a young bull in the absence of any progeny will be influenced somewhat by the way the bull scored himself relative to his herdmates. When looking at the bar graphs a bar to the right is always positive for each of the traits. The 50% is the average for the breed.

The new composites for MUSCLE, SKELTAL and FUNCTIONAL will also be presented on a similar base and scale to the previous BLUP system. They will have a percentage rank alongside to indicate where the composite on this animal ranks relative to the rest of the breed. The % ranking will vary from 1% (indicating the animal is in the bottom 1% of the breed) to 99% (indicating the animal is in the top 1% of the breed).

This is the first time most breeders will see the FUNCTIONAL index. Locomotion is scored on a scale from 1 (poor) to 10 (good). The other 3 traits are related to the feet and legs. These traits are called "intermediate optimum" traits i.e. in the case of hind leg side view if a sire is breeding progeny with a high percentage of scores of 5 or 6 relative to other sires in the breed then this sire will have a high percentage ranking (to the right on the bar chart). Alternatively, sires which are breeding a lot of straight legged or sickle legged progeny then his % ranking for hind leg side view will be poor (less than the breed average).
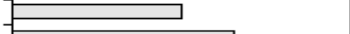
Figure 1. A diagrammatic representation of the traits scored and available in the new system

Figure 2. An example of the sales catalogue including ancestry information, €uro-star SBV values, bar chart of GROW® individual linear traits and composite indexes which will be available to breeders whose animals have been scored within the rules of the new GROW system.

Lot 52 Charlie Watford

Breed: Limousine

IE111022270211   DOB: 01-Oct-2005

Male

Owner: John Jones - Co. Longford

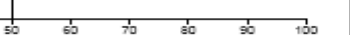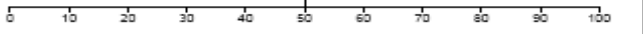| Sire: **Brefni** LM8177132385 SBV = €120 (40%)	**Lancelot** SBV = €123 (60%)	Steve
		Gaufrette
	Cecelia SBV = €43 (23%)	Sylvio
		Leontine
Dam: **StoneLake Sabina** VHB245978 SBV = €80 (40%)	**Jimmy-Dollar** SBV = €97 (60%)	Martine
		Uberta
	Lucinda SBV = €45 (22%)	Kilboy Tom
		Abbey Jennifer

€uro-Star Indexes

% Rank	Star Rating (within breed)	Indexes & Traits	€uro-Value	Data Reliability	Reliability Comment
81%	★★★★★	**Suckler Beef Value (SBV)**	**€108**	**37%**	*Medium*
90%	★★★★★	Weanling Export	€80	41%	*Medium*
88%	★★★★★	Beef Carcass	€100	42%	*Medium*
50%	★★★	Daughter Fertility	€20	10%	*Low*
57%	★★★	Daughter Milk	€15	12%	*Low*

Other Key Traits

% Rank	Star Rating	Trait	Value	%	Data Rel	Comment
75%	★★★★	*Calving Difficulty (% 3 or 4)*	*Easy-calving*	*5%*	36%	*Medium*
35%	★★	*Gestation Length*	*Long*		37%	*Medium*
90%	★★★★★	Docility	*Very Good*		35%	*Medium*

GROW® Linear Score Evaluation *(Within-Breed percentiles)*
Scored and weighed in a group of 5 and in age range 150 - 300 days

BLUP Composites (Within Breed)			
	Data Rel	% Rank	
Muscle	110	80%	85%
Skeletal	99	80%	87%
Function	95	40%	77%

Comments

Bull is full brother to Hollychamp Lisa, Champion female at Society Premier Show & Sale, August 2008. Sold for €5,700 at sale.

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Figure 3. An example of the sales catalogue including ancestry information, Parental Average €uro-star SBV values, bar chart of parental average GROW® individual linear traits and composite indexes which will be available to breeders whose animals have been scored but fall short of the rules of the new GROW® system.

Lot 52 Charlie Watford

Lot 52 Charlie Watford	**Breed: Limousine**
IE111022270211 **DOB: 01-Oct-2005**	**Male**
Owner: John Jones - Co. Longford	

Sire: **Brefni** LM8177132385 SBV = €120 (40%)	**Lancelot** SBV = €123 (60%)	**Steve**
		Gaufrette
	Cecelia SBV = €43 (23%)	**Sylvio**
		Leontine
Dam: **StoneLake Sabina** VHB245978 SBV = €80 (40%)	**Jimmy-Dollar** SBV = €97 (60%)	**Martine**
		Uberta
	Lucinda SBV = €45 (22%)	**Kilboy Tom**
		Abbey Jennifer

Parental Average €uro-Star Indexes

% Rank	Star Rating (within breed)	Indexes & Traits	€uro-Value	Data Reliability	Reliability Comment
81%	★★★★★	**Suckler Beef Value (SBV)**	**€108**	**37%**	***Medium***
90%	★★★★★	**Weanling Export**	€80	41%	*Medium*
88%	★★★★★	**Beef Carcass**	€100	42%	*Medium*
50%	★★★	**Daughter Fertility**	€20	10%	*Low*
57%	★★★	**Daughter Milk**	€15	12%	*Low*

Other Key Traits

% Rank	Star Rating	Trait		Value	Data Reliability	Reliability Comment
75%	★★★★	*Calving Difficulty (% 3 or 4)*	*Easy-calving*	5%	36%	*Medium*
35%	★★	*Gestation Length*	*Long*		37%	*Medium*
90%	★★★★★	**Docility**	*Very Good*		35%	*Medium*

Parental Average GROW® Traits (Within-Breed percentiles)
Scored but failed to meet all criteria: 1. Weighed, 2. 150-300 days, 3. Group of 5

Description		Description
Narrow	Width at withers	Wide
Narrow	Width behind withers	Wide
Narrow	Loin Development	Wide
Narrow	Dev hind quarter	Wide
Low	Thigh width	High
Short	Height at withers	Long
Short	Length of back	Long
Narrow	Length of pelvis	Wide
Small	Width at hips	Tall
Poor	Locomotion	Good
	Hind leg side view	Optimum
	Hind leg rear view	Optimum
	Fore leg front view	Optimum

% ranking   0 10 20 30 40 50 60 70 80 90 100

BLUP Composites (Within Breed)

		Data Rel	% Rank
Muscle	110	80%	85%
Skeletal	99	80%	87%
Function	95	40%	77%

Comments

Bull is full brother to Hollychamp Lisa, Champion female at Society Premier Show & Sale, August 2008. Sold for €5,700 at sale.

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Figure 4. An example of the sales catalogue including ancestry information and Parental Average €uro-star SBV values, which will be available to breeders whose animals have not been scored and weighed by an ICBF linear scorer but where a group of 5 could not have been created by the breeder for that animal while he was in the age range.

Lot 52 Charlie Watford				**Breed: Limousine**
IE111022270211		DOB: 01-Oct-2005		**Male**
Owner: John Jones - Co. Longford				

Sire:	Lancelot	SBV = €123 (60%)	Steve
Brefni			Gaufrette
LM8177132385 SBV = €120 (40%)	Cecelia	SBV = €43 (23%)	Sylvio
			Leontine
Dam:	Jimmy-Dollar	SBV = €97 (60%)	Martine
StoneLake Sabina VHB245978			Uberta
SBV = €80 (40%)	Lucinda	SBV = €45 (22%)	Kilboy Tom
			Abbey Jennifer

Parental Average €uro-Star Indexes

% Rank	Star Rating (within breed)	Indexes & Traits	€uro-Value	Data Reliability	Reliability Comment
81%	★★★★★	**Suckler Beef Value (SBV)**	€108	37%	*Medium*
90%	★★★★★	Weanling Export	€80	41%	*Medium*
88%	★★★★★	Beef Carcass	€100	42%	*Medium*
50%	★★★	Daughter Fertility	€20	10%	*Low*
57%	★★★	Daughter Milk	€15	12%	*Low*

Other Key Traits

%	Star	Trait	Value	%	Data Reliability	Reliability Comment
75%	★★★★	*Calving Difficulty (% 3 or 4)*	*Easy-calving*	5%	36%	*Medium*
35%	★★	*Gestation Length*	*Long*		37%	*Medium*
90%	★★★★★	Docility	*Very Good*		35%	*Medium*

Animal Not Scored an by ICBF Linear Scorer. A group of 5 animals in the 150-300 day age range <u>would not</u> have been possible

Comments

Bull is full brother to Hollychamp Lisa, Champion female at Society Premier Show & Sale, August 2008. Sold for €5,700 at sale.

© *Irish Cattle Breeding Federation ICBF, January 2010.*

Figure 5. An example of the sales catalogue including ancestry information and Parental Average €uro-star SBV values, which will be available to breeders whose animals have not been scored and weighed by an ICBF linear scorer but where a group of 5 could not have been created by the breeder for that animal while he was in the age range.

Lot 52 Charlie Watford			Breed: Limousine
IE111022270211	DOB: 01-Oct-2005		Male
Owner: John Jones - Co. Longford			
Sire:	Lancelot	Steve	
Brefni		Gaufrette	
LM8177132385	Cecelia	Sylvio	
		Leontine	
Dam:	Jimmy-Dollar	Martine	
StoneLake Sabina		Uberta	
VHB245978	Lucinda	Kilboy Tom	
		Abbey Jennifer	

Animal Not Scored by an ICBF Linear Scorer. A group of 5 animals in the 150-300 day age range <u>would have</u> been possible

Comments

Bull is full brother to Hollychamp Lisa, Champion female at Society Premier Show & Sale, August 2008. Sold for €5,700 at sale.

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This new evaluation has been developed completely separate from the old system with all the evaluation inclusion rules applying as above. All animals previously scored were included if they met the criteria of a group of 5 but the extra criteria of 150-300 days is being implemented from 1/01/2010 onwards. As with any change to a new system there will be re-ranking of animals on the new system due to changes in the way the existing data was used with some sires affected more than others by the new contemporary group rules. Tables 3a, 3b and 3c below show the changes for the bands at which an animal is ranked in the Top 20%, Top 10%, Top 5% and Top 1% for the old BLUP composites and the new BLUP composites for the Charolais, Limousin and Simmental breeds, respectively.

Table 3a. Changes is the bands for rankings for the Charolais

Charolais							
% Ranking	Old Muscle	New Muscle		Old Skeletal	New Skeletal		New Functional
Top 1%	133	125		130	125		126
Top 5%	126	117		122	117		117
Top 10%	122	113		118	113		112
Top 20%	118	109		114	109		107
Top 40%	112	104		108	104		102
average	109	102		106	102		99

Table 3b. Changes is the bands for rankings for the Limousine

Limousin							
% Ranking	Old Muscle	New Muscle		Old Skeletal	New Skeletal		New Functional
Top 1%	132	126		132	126		123
Top 5%	125	118		125	118		117
Top 10%	121	114		121	114		113
Top 20%	117	110		117	109		109
Top 40%	111	104		111	104		103
average	107	102		107	101		100

Table 3c. Changes is the bands for rankings for the Simmental

Simmental							
% Ranking	Old Muscle	New Muscle		Old Skeletal	New Skeletal		New Functional
Top 1%	129	125		124	125		118
Top 5%	121	117		117	117		114
Top 10%	117	113		113	114		111
Top 20%	113	109		108	109		108
Top 40%	107	103		102	104		103
average	105	101		100	102		101

Docility
Docility is currently published only for pedigree Limousine cattle and is based on the docility score recorded by linear scorers. This evaluation will be replaced by a new docility evaluation which combines the linear score docility and the docility recorded through the Suckler Welfare Scheme.
Where an animal is linear scored and also has a score from the Suckler Welfare Scheme then the linear scorer docility is used. The new figures will be presented with a verbal comment depending on whether the animal is in the Bottom 20% ("Very poor"), Bottom 40% "Poor", Breed average, ("Breed Average"), Top 40% ("Good") or Top 20% ("Very Good"). The new docility figures will be available for all breeds.

Gestation
The new catalogue will also show the animal's genetic merit for gestation length also with a verbal description from Short to Long gestation.

Milk & Fertility
The new catalogue will also have the "Milk & Fertility" index broken up into a Milk index and a Fertility index based on feedback from the industry.

Reliability
The reliability of each of the indexes will also include a verbal comment indicating the category of reliability the animal falls into for this index or trait based on the spread in reliability of all young sires.

% Rank
A percentage rank will also be shown for both the €uro-star SBV traits and the new composite MUSCLE, SKELETAL and FUNCTIONAL indexes to indicate where the animal ranks relative to the rest of the breed. The % rank varies from 1% (Bottom 1%) to 99% (Top 1%).

Timeframe for new evaluation rules and publication
New evaluation inclusion rules
The date for implementation of the 9 new evaluation rules for linear scoring is the 1/01/2010.

Publication of proofs
- All printed evaluation documents pertaining to linear scoring and BLUPs will have the new figures from 1/01/2010 onwards.

- All web profiles which currently show BLUP muscle or skeletal composites will display the composites from the new evaluation from 1/01/2010 onwards.

New GROW® Report
A new GROW® Report has been developed which will replace the existing BLUP report post weaning. This report will give an early feedback to the farmer on the results of the scoring. The report will also highlight the % of records which will make it into the evaluations which is a very important statistic for the breeder expecting updated indexes on the scored animals. An example of this report is attached below:

All breeds
The new indexes and reports will now be available to all pedigree cattle which are scored across all the beef breeds. So this is a major step forward for all the breeds which have not had this type of

information before but it is also a big advancement in terms of better utilization of the scoring data for the breeds which have already heavily invested in linear scoring.