

Igenity Profiles



January 2022

Dr Iain Graham, Killochries Fold

Highland Cattle Society Breed Development Report (year ending 2021).

All bulls registered during 2021 were DNA tested. The idea behind this is to help us as a society to introduce more scientific measures for managing our herds. The DNA testing covers a wide range of attributes for the cattle, including parentage along with sixteen performance traits (using Neogen Ingenuity Beef).

The reference base was created in America and consists of thousand of commercial and pedigree cattle. However, while there is a large proportion of British breeds and their crosses in the group, Highlanders are not represented.

We are therefore comparing our results against commercial cattle and as you can see, the results are encouraging.

In the future we can submit phenotype data (physical data) that will allow us to enhance the DNA scores so that we can produce Highland Cattle specific results. The phenotype data should be from farms with similar management systems but for now, we can learn from this year's results and compare it to what we know.

Why is this important?

SELECT, MANAGE AND MARKET YOUR CATTLE

- Select replacement heifers that move you ahead on your fertility, production and quality goals
- Use DNA scores to manage breeding and production potential
 - Leverage data in calf marketing, bred heifer sales or retained-ownership decisions

MATERNAL, PERFORMANCE AND CARCASS TRAITS

- Pinpoint herd strengths and improvement areas
- Easy-to-read 1 to 10 scoring
- Predict traits heifers will pass on to their offspring

INDEXES FOR SELECTION DECISIONS

- Designed for multi-trait selection
 - Emphasize balanced, maternal or beef system qualities
- Online tools to build your own index

The 16 Traits of Igenity

MATERNAL

Birth Weight

Calving Ease Direct

Calving Ease Maternal

Heifer Pregnancy

Milk

Stayability

Docility

GROWTH

Weaning Weight

Average Daily Gain

Yearling Weight

Residual Feed Intake

CARCASS

Marbling

Rib Eye Area

Fat Thickness

Tenderness

Hot Carcass Weight

MATERNAL

Birth Weight (BW)

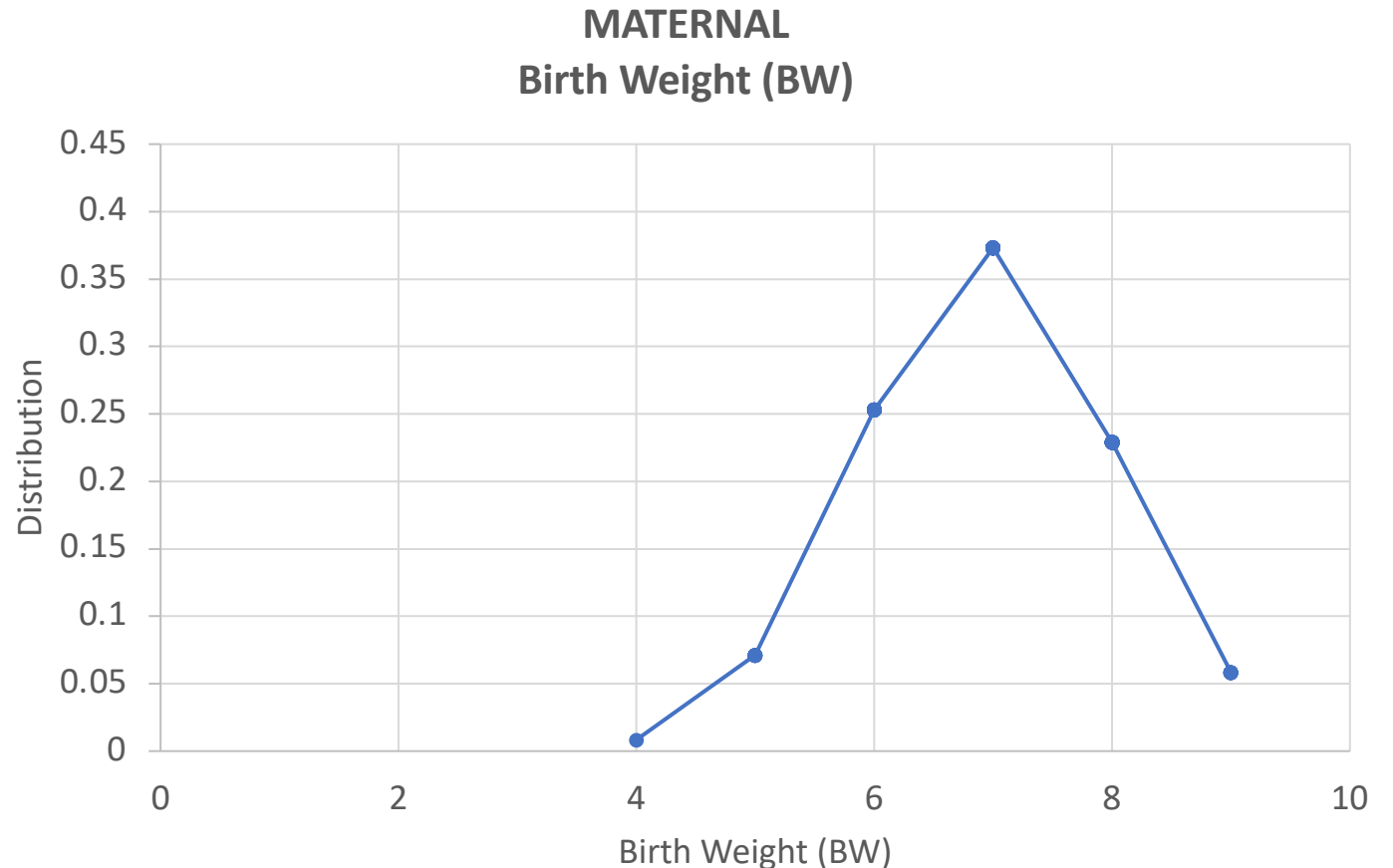
Higher score is higher birthweight potential. Heavy calves can cause calving difficulty but also have more growth potential.

Birth weight scores from 4 to 9 would indicate that our birth weights are high for the size of our cows. This is confirmed in the table below. With only one cow requiring assistance, we would prefer to keep the birth weight up as the higher weights are not compromising calving ease.

(CED or CEM in selection indexes are preferred over BW alone)

Actual Scores: 4-9

Average: 6.94



Female Calf Weights 2020

Tag No	DOB	Sex	Breed	Colour	Dam	Sire	Weight	Score	Ease
UK583241 701387	29/11/2019	F	HI	Dun	UK583241 100429	UK583241 700897	30		Unassisted
UK583241 401398	22/03/2020	F	HI	Red	UK583241 200248	UK583241 200871	32	1	Unassisted
UK583241 701464	27/03/2020	F	HI	Red	UK583241200206	UK583241200871	36	1	Unassisted
UK583241 301467	27/03/2020	F	HI	Red	UK583241100618	UK583241200871	36	2	Unassisted
UK583241 401468	28/03/2020	F	HI	Black	UK583241701142	UK583241600077	35	1	Unassisted
UK583241 501469	29/03/2020	F	HI	Red	UK583241401020	UK583241200871	38	1	Unassisted
UK583241 601470	31/03/2020	F	HI	Black	UK583241301173	UK583241600077	38	1	Unassisted
UK583241 701471	01/04/2020	F	HI	Red	UK583241500636	UK110584500021	32	1	Unassisted
UK583241 401475	05/04/2020	F	HI	Red	UK583241100387	UK583241200871	35	3	Unassisted
UK583241 701478	06/04/2020	F	HI	Dun	UK583241601113	UK282865100263	33	1	Unassisted
UK583241 101479	06/04/2020	F	HI	Dun	UK583241701121	UK282865100263	35	1	Unassisted
UK583241 401482	05/04/2020	F	HI	White	UK583241400523	UK583241200871	28	2	Unassisted
UK583241 501483	08/04/2020	F	HI	Red	UK583241701086	UK282865100263	38	1	Unassisted
UK583241 601484	08/04/2020	F	HI	Red	UK583241201095	UK282865100263	39	1	Unassisted
UK583241 501490	15/04/2020	F	HI	Red	UK583241100485	UK583241700897	35	1	Unassisted
UK583241 601491	15/04/2020	F	HI	Black	UK583241300697	UK110584500021	35	3	Unassisted
UK583241 701562	27/04/2020	F	HI	Red	UK583241401195	UK110584500021	36	1	Unassisted
UK583241 201564	17/04/2020	F	HI	Red	UK540593200240	UK110584500021	40	2	Unassisted
UK583241 301565	27/04/2020	F	HI	White	UK583241100247	UK583241200871	36	3	Unassisted
UK583241 401566	29/04/2020	F	HI	Red	UK583241500314	UK583241200871	28	1	Unassisted
UK583241 301572	27/05/2020	F	HI	White	UK583241600980	UK583241200871	35	1	Unassisted
UK583241 501574	10/06/2020	F	HI	Red	UK583241701170	UK282865100263	36	1	Unassisted
UK583241 701576	26/06/2020	F	HI	Black	UK583241701009	UK110584500021	37	1	Unassisted
UK583241 301579	10/07/2020	F	HI	Red	UK583241400243	UK583241200871	36	2	Unassisted
UK583241 501581	01/08/2020	F	HI	Black	UK583241201172	UK110584500021	34	1	Unassisted
UK583241 601582	08/08/2020	F	HI	Red	UK583241100030	UK583241200871	28	3	Unassisted
Females		26					901		
Average Weight		34.65							

Male Calf Weights 2020

Tag No	DOB	Sex	Breed	Colour	Dam	Sire	Weight	Score	Ease
UK583241 101388	06/01/2020	M	HI	Black	UK509314 400005	UK583241 700897	28	1	Unassisted
UK583241 201389	22/01/2020	M	HI	Red	UK583241 100520	UK583241 700897	28	2	Unassisted
UK583241 401391	07/02/2020	M	Hi	Black	UK509314 300004	UK583241 700897	35	1	Unassisted
UK583241 501392	12/02/2020	M	HI	Black	UK583241 600546	UK583241 700897	33	1	Unassisted
UK583241 601393	20/03/2020	M	HI	Red	UK542806 200144	UK583241 200871	30	5	Unassisted
UK583241 101395	20/03/2020	M	HI	Red	UK583241 200437	UK583241 700897	38	2	Unassisted
UK583241 201396	21/03/2020	M	HI	Black	UK583241 600665	UK110584 500021	32	1	Unassisted
UK583241 301397	21/03/2020	M	HI	Red	UK583241 400908	UK583241 200871	34	2	Unassisted
UK583241 501462	25/03/2020	M	HI	White	UK583241600490	UK583241200871	38	3	Unassisted
UK583241 601463	27/03/2020	M	HI	Red	UK583241400299	UK110584500021	33	3	Unassisted
UK583241 101465	27/03/2020	M	HI	White	UK583241400607	UK583241200871	38	1	Unassisted
UK583241 201466	27/03/2020	M	HI	White	UK583241400726	UK583241200871	40	1	Unassisted
UK583241 101472	01/04/2020	M	HI	Black	UK587605100001	UK583241600077	34	1	Unassisted
UK583241 301474	04/04/2020	M	HI	Red	UK583241700918	UK583241200871	32	2	Unassisted
UK583241 601477	06/04/2020	M	HI	White	UK583241300977	UK583241200871	38	1	Unassisted
UK583241 201480	12/04/2020	M	HI	Black	UK583241100947	UK110584500021	38	1	Unassisted
UK583241 301481	12/04/2012	M	HI	Black	UK540416400406	UK110584500021	40	3	Unassisted
UK583241 701485	08/04/2020	M	HI	Dun	UK583241400768	UK583241200871	30	2	Unassisted
UK583241 201487	15/04/2020	M	HI	Black	UK583241400488	UK583241700897	38	2	Unassisted
UK583241 301488	13/04/2029	M	HI	Red	UK583241501126	UK282865100263	28	1	Unassisted
UK583241 701492	15/04/2020	M	HI	Black	UK583241200290	UK110584500021	40	4	Unassisted
UK583241 101563	17/04/2020	M	HI	Black	UK509314700001	UK583241700897	38	2	Unassisted
UK583241 501567	01/05/2020	M	HI	Dun	UK583241200465	UK583241700897	36	1	Unassisted
UK583241 701569	11/05/2020	M	HI	Black	UK560288600329	UK110584500021	36	1	Unassisted
UK583241 101570	13/05/2020	M	HI	Black	UK540416500407	UK110584500021	42	3	Unassisted
UK583241 201571	17/05/2020	M	HI	Red	UK583241300543	UK110584500021	46	1	Unassisted
UK583241 401573	26/05/2020	M	HI	Black	UK509314100002	UK583241700897	28	3	Unassisted
UK583241 601575	19/06/2020	M	HI	Black	UK583241701058	UK282865100263	49	1	Unassisted
UK583241 101577	28/06/2020	M	HI	Red	UK583241700449	UK583241200871	38	2	Unassisted
UK583241 201578	28/06/2020	M	HI	Red	UK583241101213	UK282865100263	36	1	Unassisted
UK583241 401580	17/07/2020	M	HI	Red	UK583241601218	UK282865100263	35	1	Unassisted
UK583241 701583	11/08/2020	M	HI	Dun	UK583241400593	UK583241200871	40	1	Assisted
UK583241 101584	19/08/2020	M	HI	White	UK583241 300487	UK583241 200871	32	2	Unassisted
Males		33					1181		
Average Weight		35.79							

MATERNAL

Calving Ease Direct (CED)

Greater probability a calf will be born unassisted out of a first-calf heifer, including birth weight and shape of the calf. A higher value is greater calving ease.

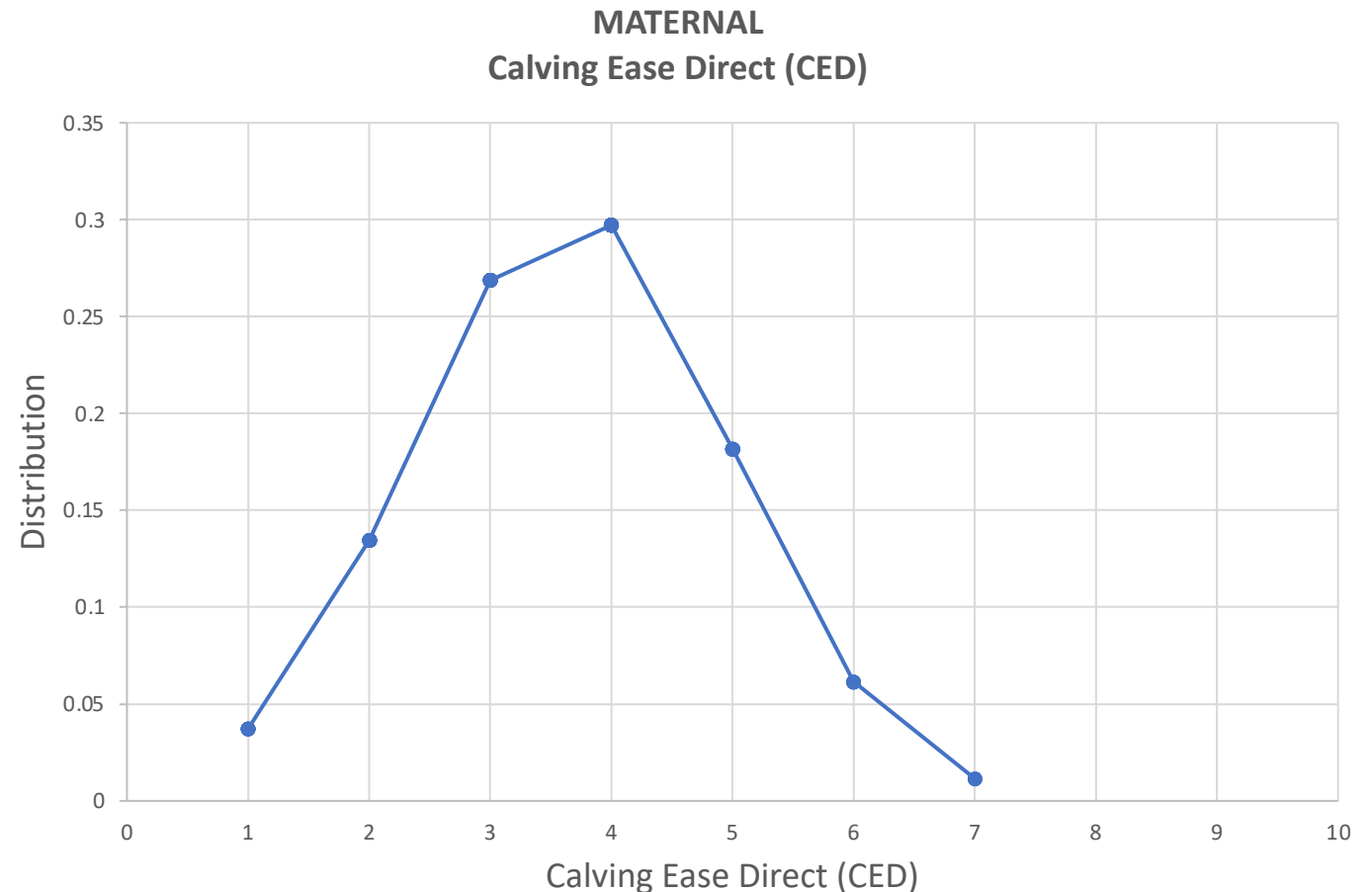
Calving Ease Direct (CED) has a surprisingly low score, which is surprising as we do not see calving problems within the Highland herd. In fact, many breeders cross with large bulls, producing even heavier calves without calving difficulties.

If you were to compare the size of an Angus with the size of its calf, I think you will find the Angus calf is proportionately smaller when compared to its mother's weight.

It would be useful to measure the pelvic area of first calving highlanders to establish if the pelvic area is large for the size of the cow.

Clearly calving ease is a trait we wish to protect.

Actual Scores: 1-7
Average: 3.67



MATERNAL

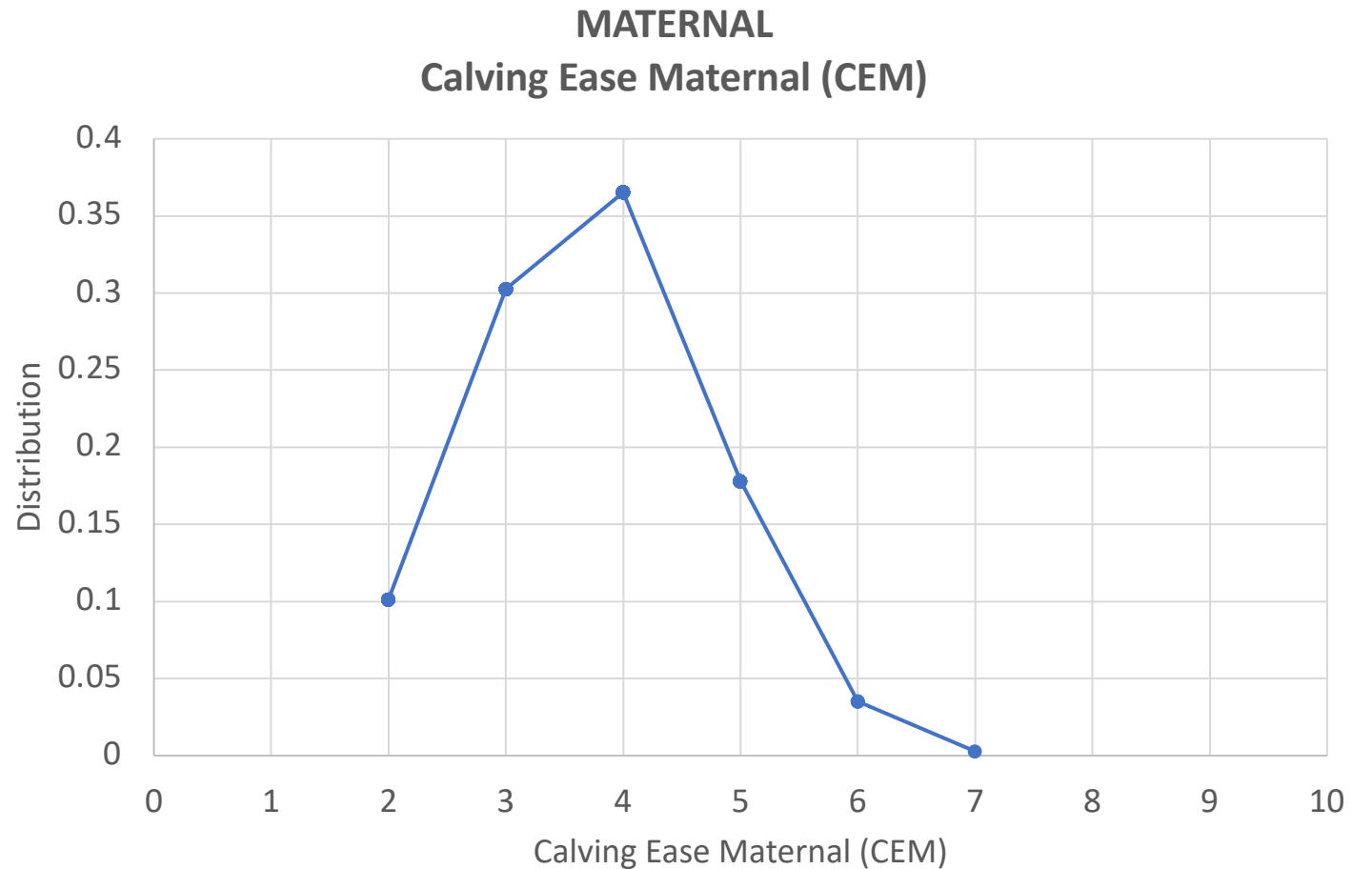
Calving Ease Maternal (CEM)

Includes all genetic factors that impact a first-calf heifer's ability to calve unassisted, such as pelvic area and her genetics for birth weight. Higher value is more calving ease.

We are seeing a large spread and some bulls with a very low score. It would make sense to report any calving difficulties, if they exist, and track back to the bulls to check their DNA.

Breeders wishing to protect calving ease should select bulls with higher CEM scores.

Actual Scores: 2-7
Average: 3.71



MATERNAL

Heifer Pregnancy Rate (HPR)

This is a heifer's potential to conceive during breeding season, relative to other heifers. A higher value is desired.

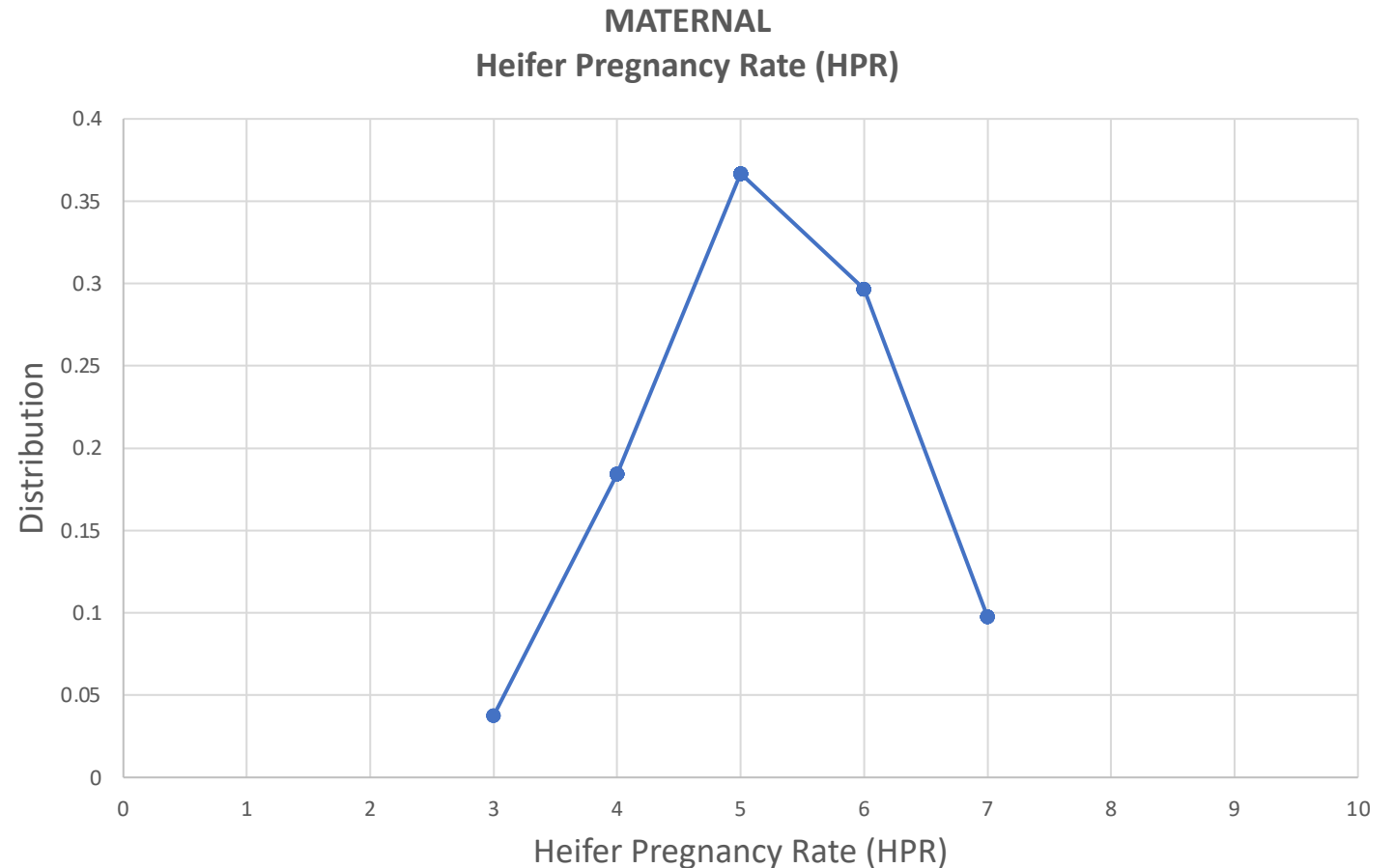
The spread on this trait is quite tight and is as you would expect. Pregnancy rate can be adversely affected by allowing the heifer to become too fat before first service.

Heifers that are pushed too hard during their sexual development will develop fat on their mammary glands, which will adversely affect their lifetime milk production.

In the case of bulls, heavy grain feeding during sexual development will produce an excessive fat build up in their testicles making them less fertile or even infertile.

Actual Scores: 3-7

Average: 5.26



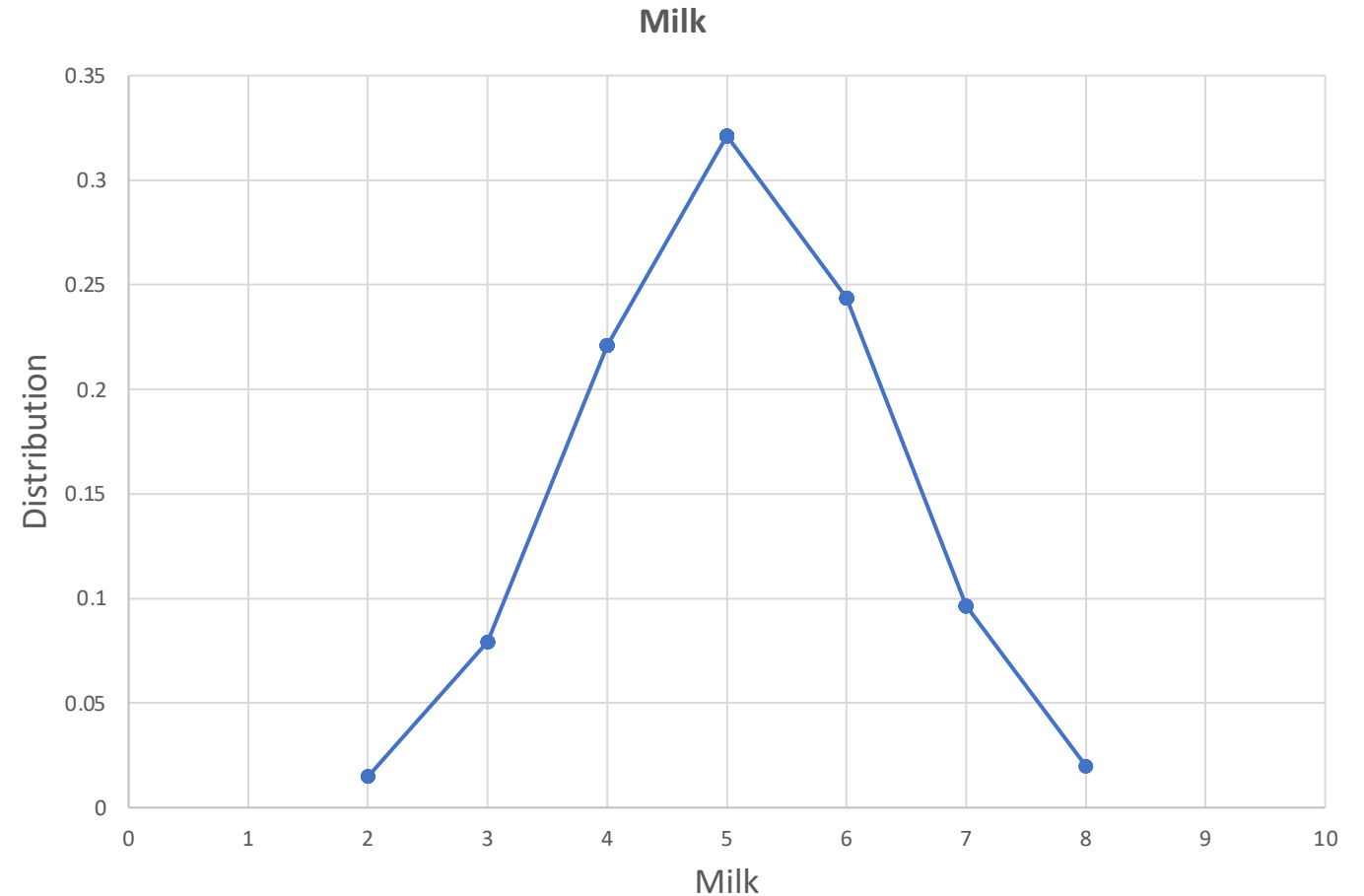
MATERNAL

Milk

Pounds of calf weaning weight due to dam's milk production.
Optimize "milk" to the forage environment.

Breeders wishing to have their heifers milking better should
look for a higher score for both bulls and heifers.

Actual Scores: 2-8
Average: 5.07



MATERNAL

Stayability (Stay)

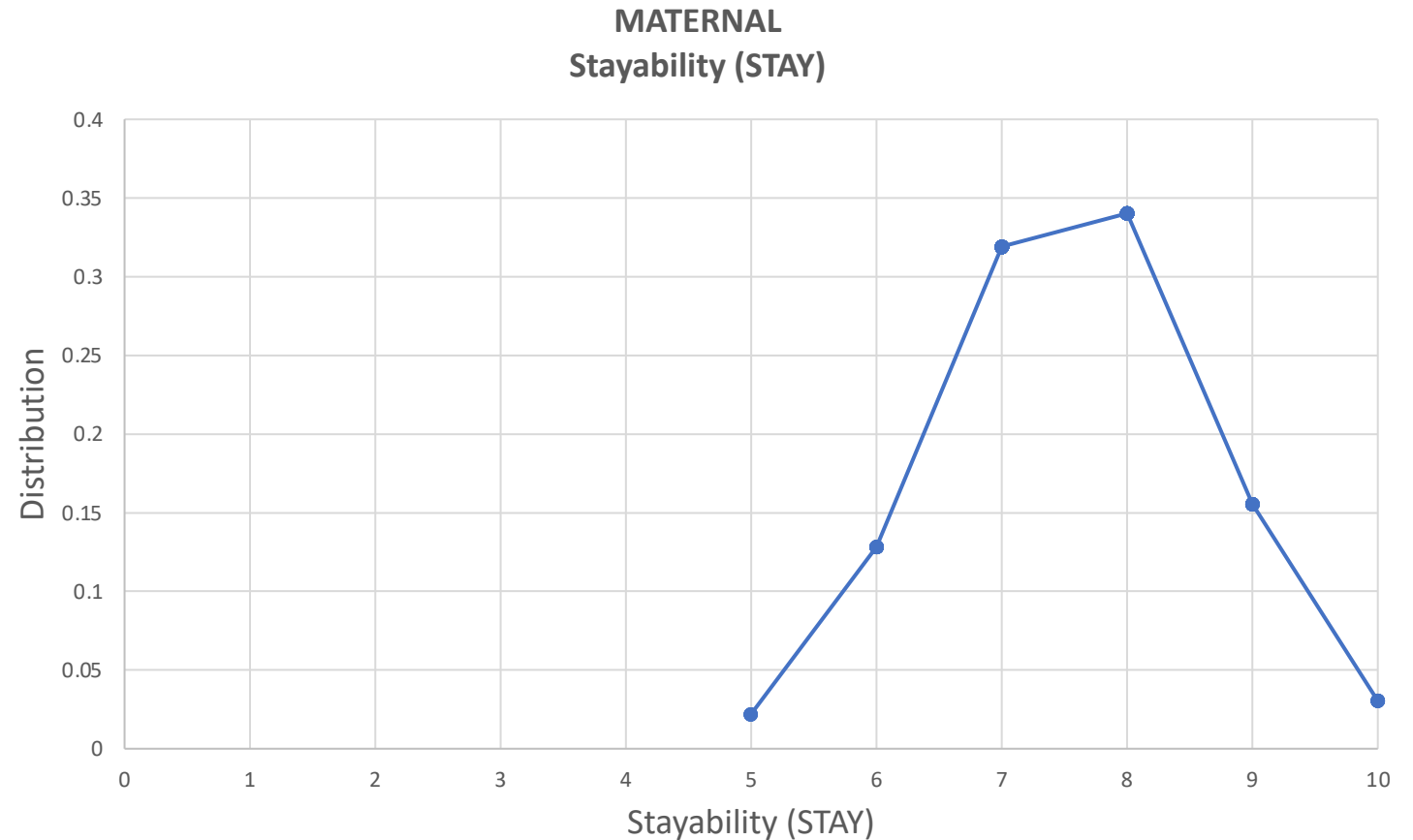
The chance a heifer will remain in the herd as a productive cow until at least six years of age. A higher value is desired.

Stayability in Highlanders is exceptional with breeding cows averaging about sixteen productive years and some top cows calving ever year into their early twenties.

A trait we wish to protect as this offsets the the costs of replacement due to calving older than other breeds.

Actual Scores: 5-10

Average: 7.57



MATERNAL

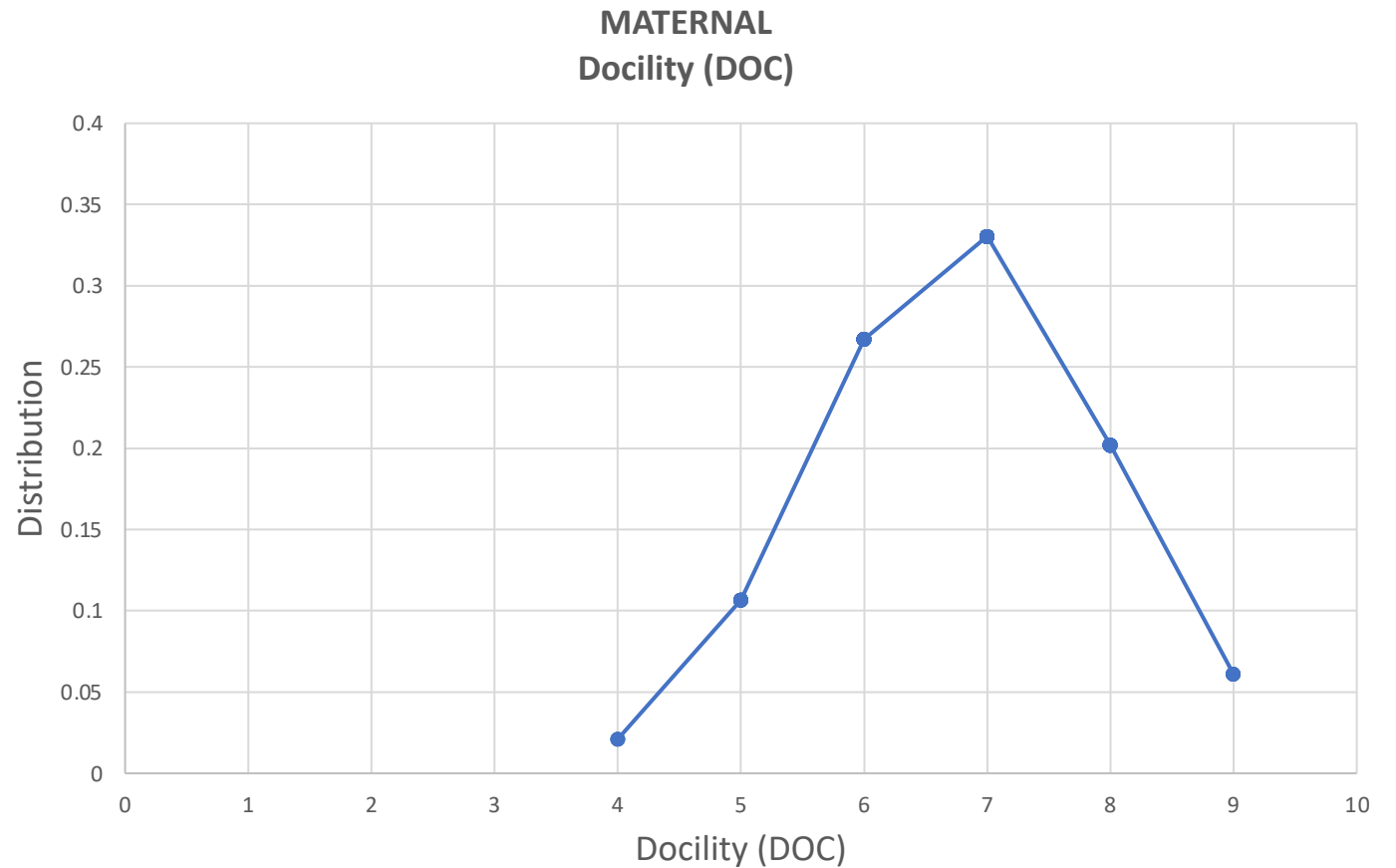
Docility (Doc)

Genetic potential to be calm or have calm offspring. Higher scores indicate a higher probability acceptable disposition.

Good score as expected.

New breeders may want to look for higher scores for this trait.

Actual Scores: 4-9
Average: 6.8



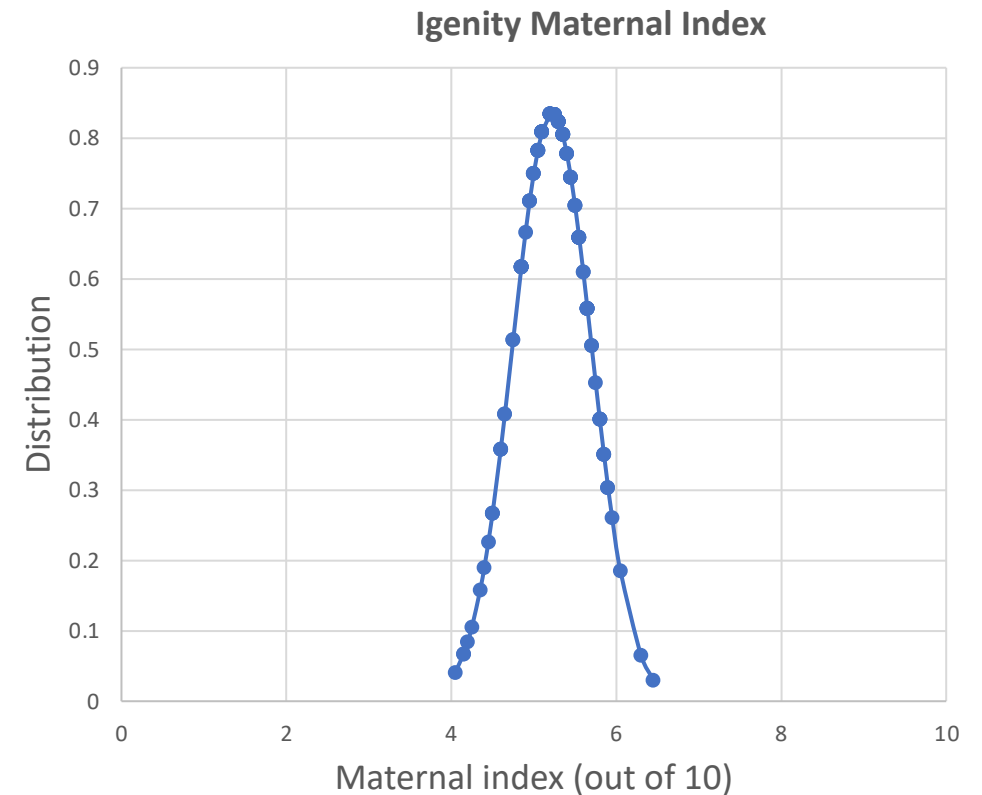
Igenity Maternal Index (IMI)

This index is highly maternal and designed to select replacement heifers for fertility, longevity and higher weaned calf weight. It is a tool developed for producers who sell calves at weaning or after a short backgrounding period. Trait Weightings: CED 10%, CEM 15%, HPR 15%, STAY 20%, WW 20%, RFI -10%, MILK 10%.

See the above weightings and decide if these weightings are relevant to your management aims, otherwise choose the traits that best meet your objectives and give them a higher weighting.

GRAPH OF MATERNAL INDEX.
(OUT OF POSSIBLE 10)

Actual Scores: 4.05-6.45
Average: 5.22



GROWTH

Weaning Weight (WW)

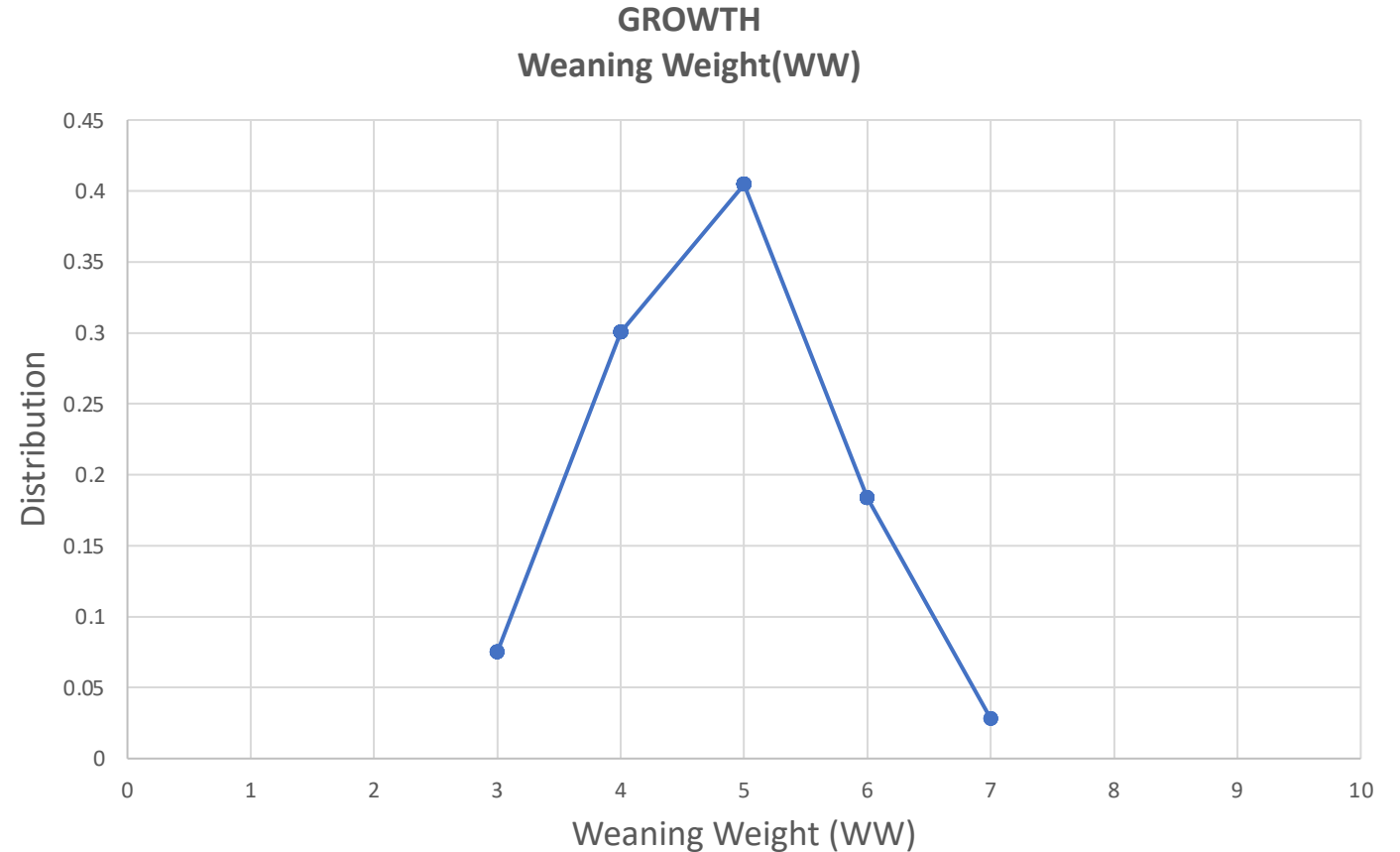
Difference in average 205-day weight. The higher the number, the greater the weaning weight of calves.

Weaning weight for Highland calves, without creep, should be .75Kg to 1.00Kg per day for heifers and over 1.00Kg per day for bull calves.

Higher Milk score should also help weaning weight.

Actual Scores: 3-7

Average: 4.77



GROWTH

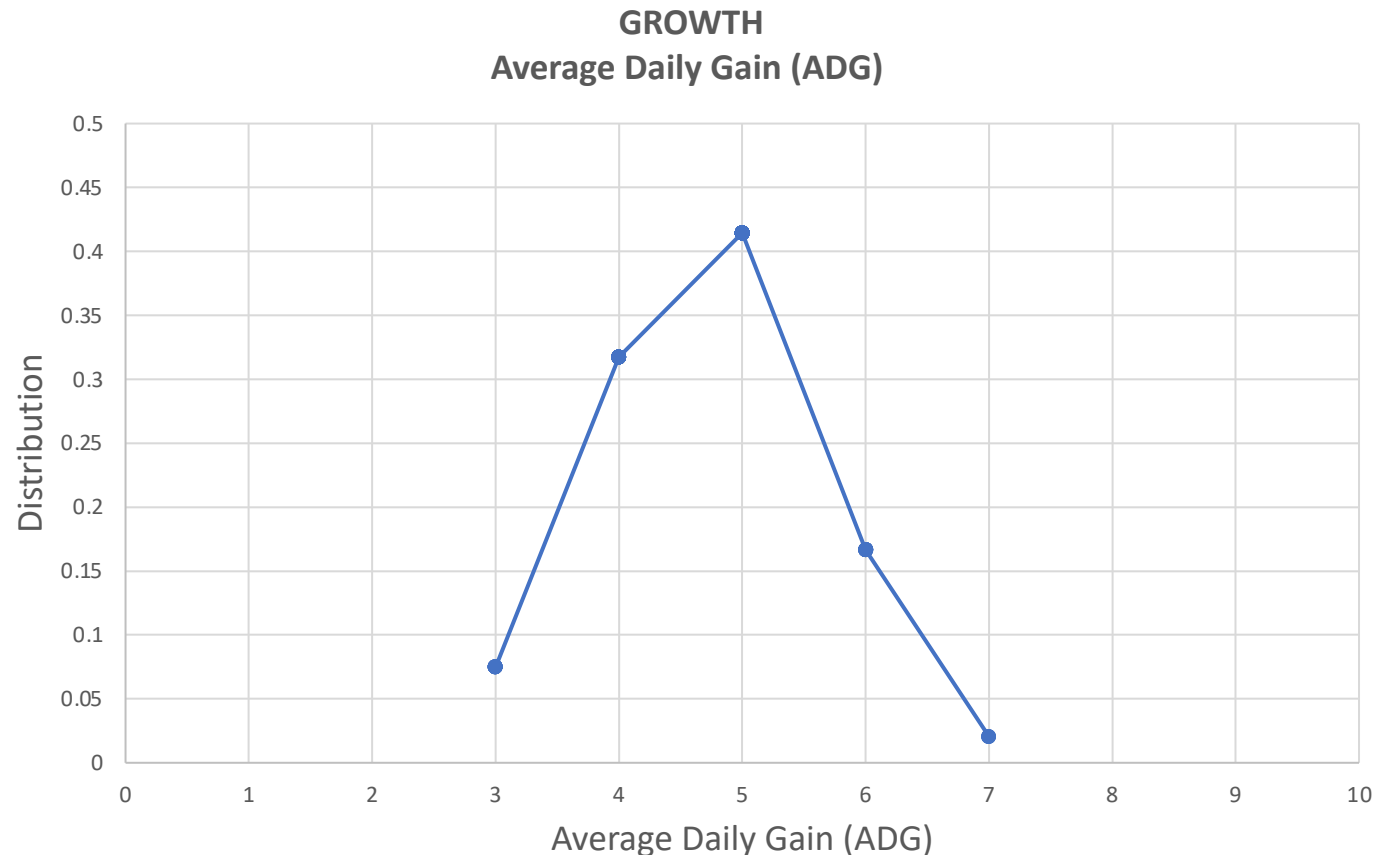
Average Daily Gain (ADG)

Based on pounds of gain per day. The Igenity score for Average Daily Gain (ADG) identifies genetic potential for post-weaning growth.

This trait is measuring the potential after weaning but will be dependent on the feeding and management practices post weaning.

We believe Highlanders are not as good as continental cattle at converting grain but perform well on a grass. It may be that we should extend the period before weaning as their performance on their mother's milk is good.

Actual Scores: 3-7
Average: 4.73



GROWTH

Yearling Weight (YW)

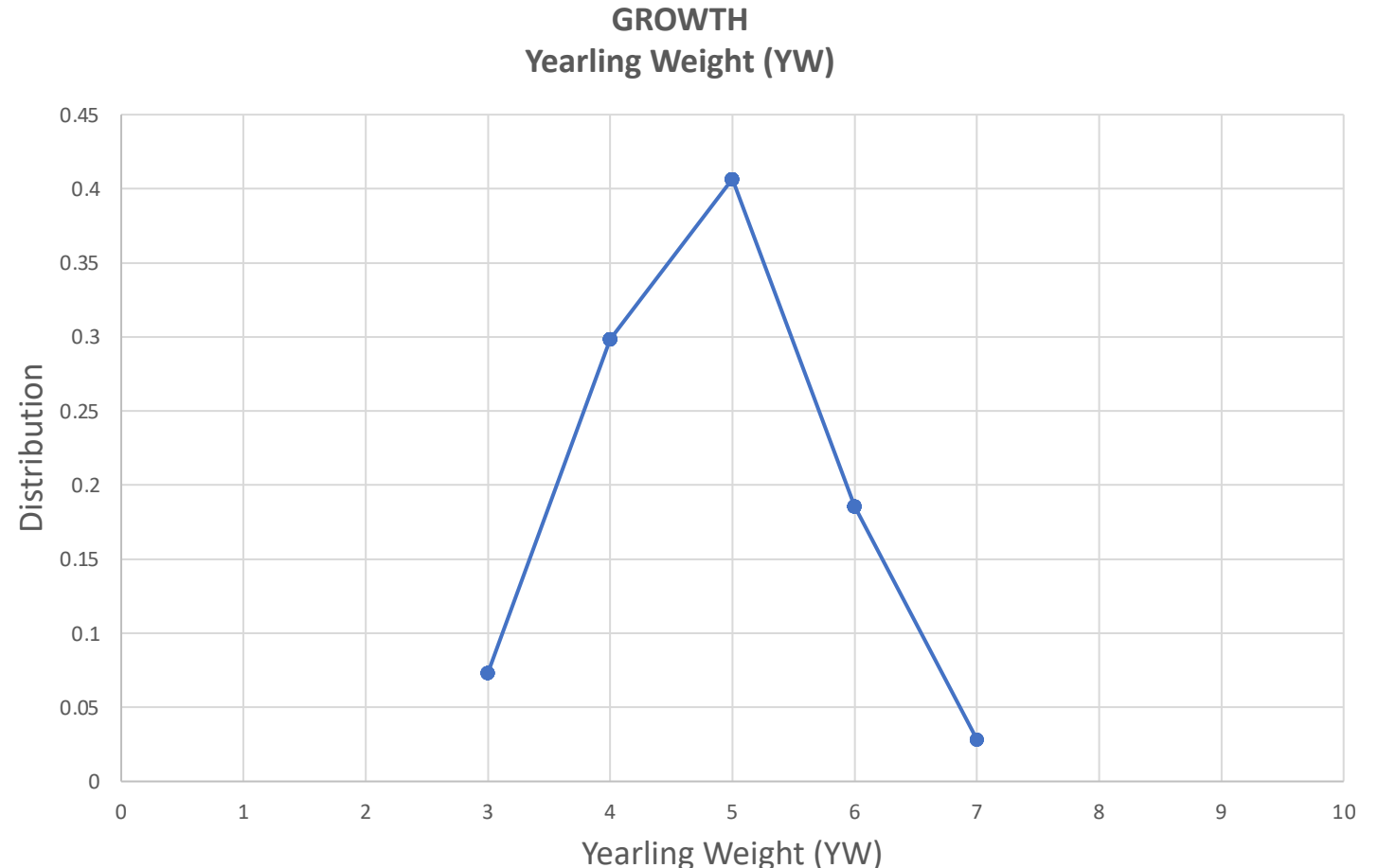
Difference in average 365-day weight. The higher the number, the greater the yearling weight.

Yearling weight could be better. In practice there seem to be little weight gain, post weaning, during the first winter. Then when the new grass arrives there is rapid growth (Compensatory Gain).

We have a trial running, that extends the weaning period. We wish to establish, if by over wintering the calves on their mothers, their live weight gain improves, giving us better yearling weights.

The mothers enter the winter with a condition score of 7 and should, naturally, drop to 5 before recovering back to 7 prior to calving. This trial requires a later calving period and will probably not be suitable for show cattle.

Actual Scores: 3-7
Average: 4.78



GROWTH

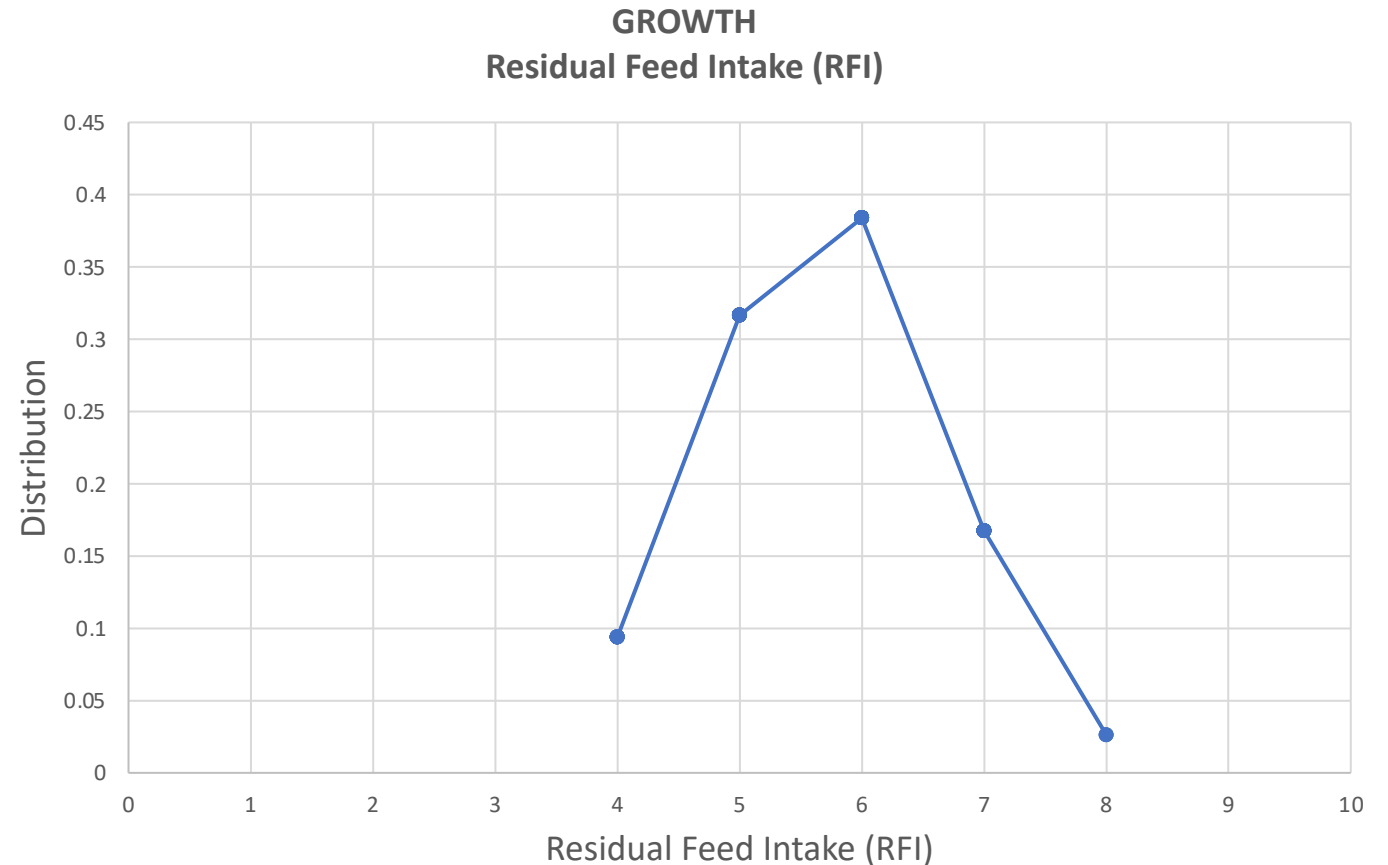
Residual Feed Intake (RFI)

This is an indicator of feed efficiency. It is the difference in animals' daily consumption of feed to achieve the same level of daily gain. Lower RFI indicates greater feed efficiency.

In this case we are looking for a lower figure, although in a grass fed environment, this would, in practise, be difficult to measure.

Outliers at 8 may not make good steers for production, as their cost to finish may not be optimal.

Actual Scores: 4-8
Average: 5.69



CARCASS

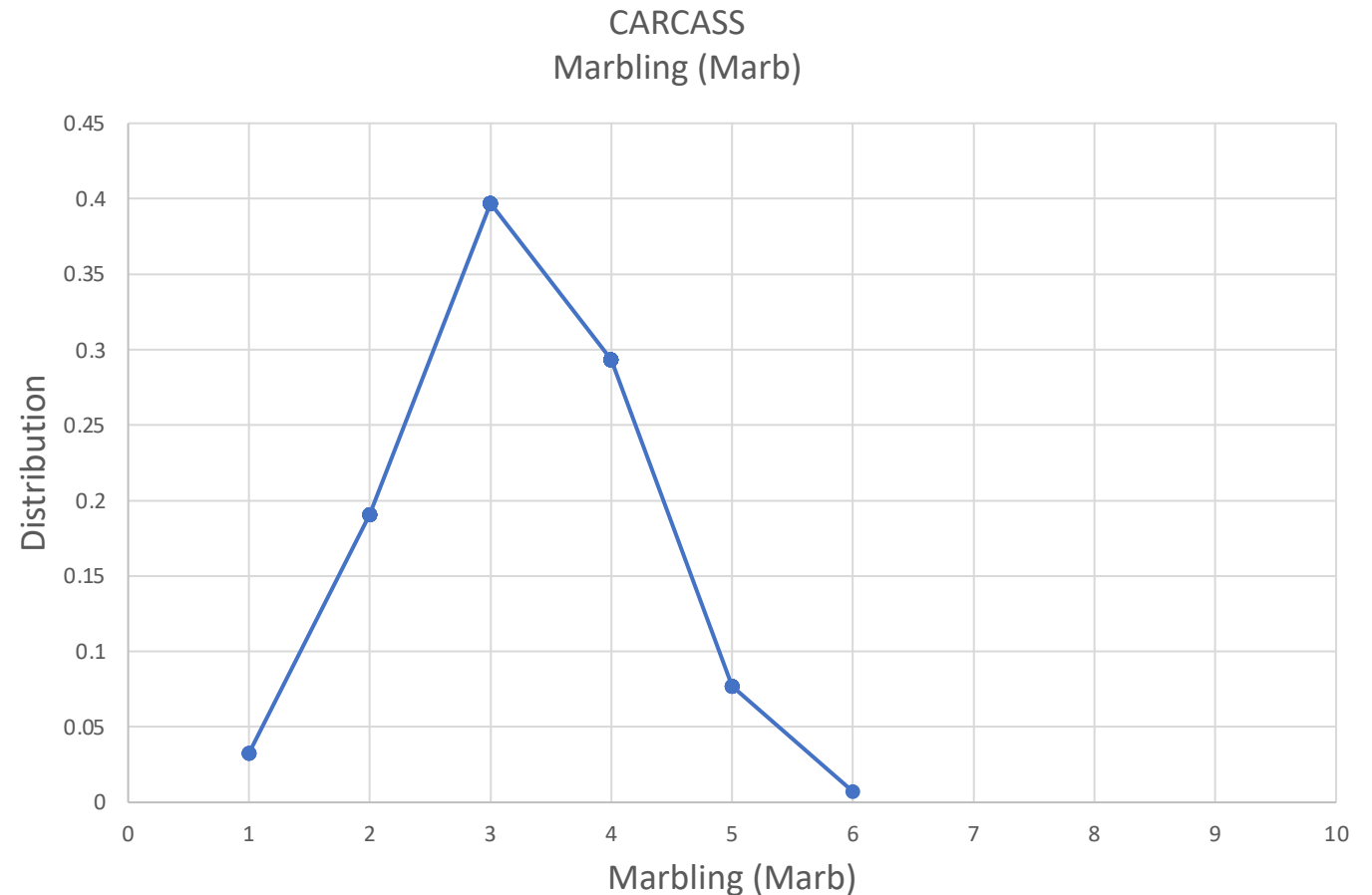
Marbling (Marb)

USDA marbling score at a similar end-point. The higher the marbling, the higher the USDA quality grade.

This figure is lower than we expected with outliers at 1. Breeders selling their meat direct may well be interested in this trait but if selling to the commodity market with the current EUROPE grading system, no benefit will be gained by increasing quality until the system of grading is changed.

Actual Scores: 1-6

Average: 3.21



CARCASS

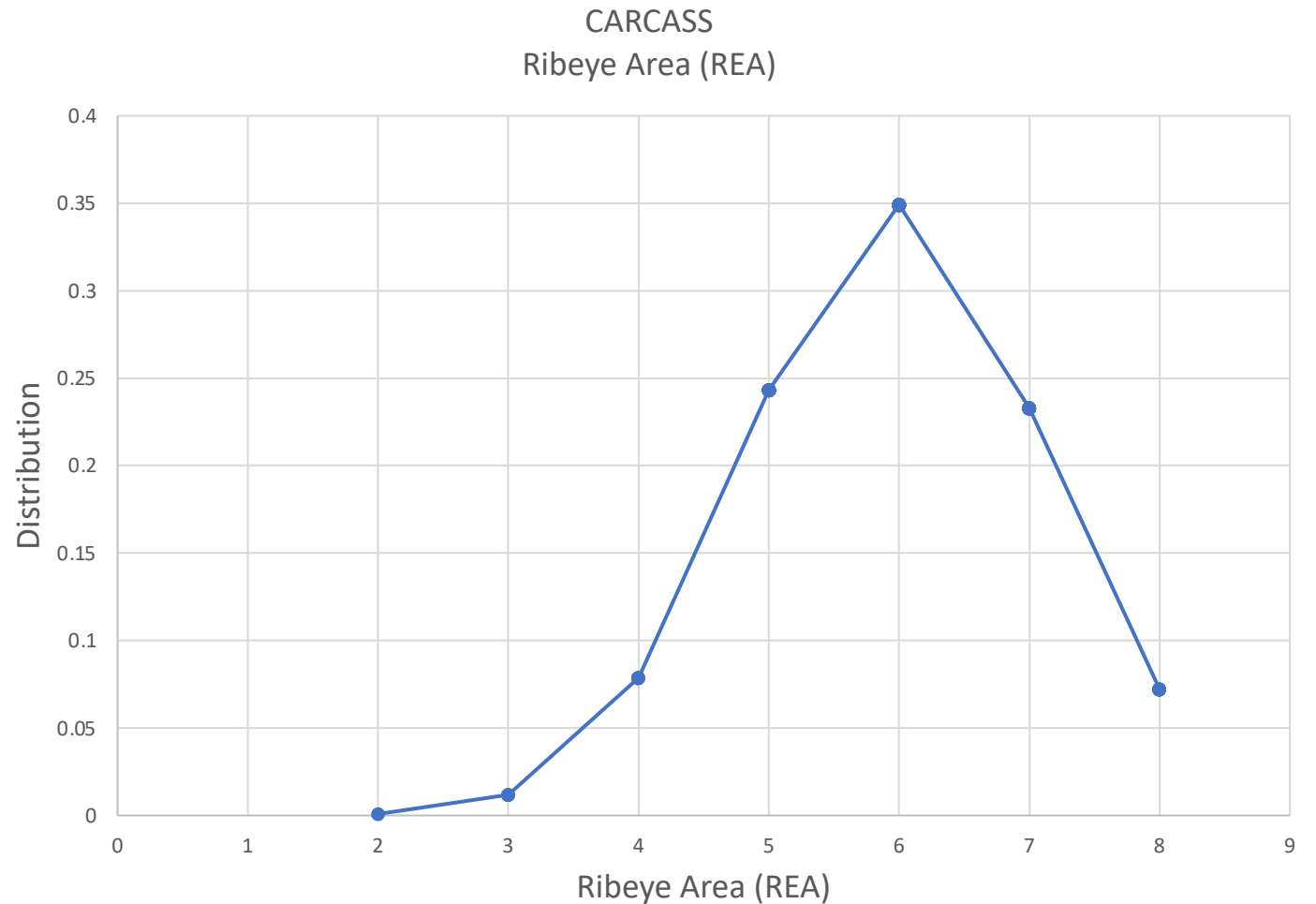
Ribeye Area (REI)

Ribeye area as measured on a carcass. REA estimates muscling in a beef carcass in square inches of ribeye at the 12th rib. Larger REA progeny have more muscle and higher percentage of retail product.

A wide spread. Again, this will be of interest to breeders selling their meat direct and in this case a higher score should improve the grading under the present system.

Actual Scores: 2-8

Average: 5.97



CARCASS

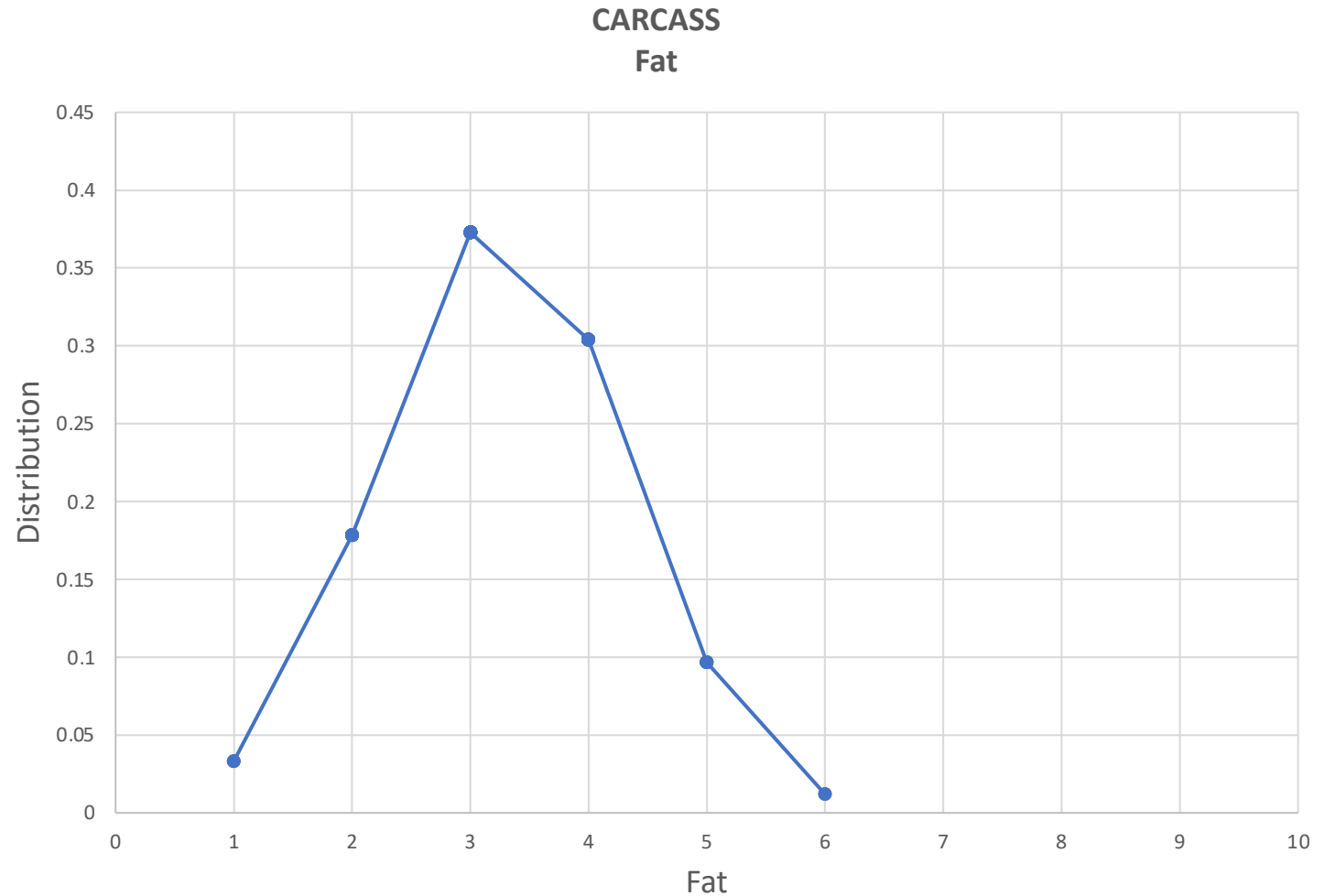
Fat thickness

Backfat as measured on a carcass. Fat thickness is scored as depth of fat in inches over the ribeye muscle at the 12th rib. Higher fat thickness scores equate to lower lean yield.

The results are as we would expect, as we know Highland meat is relatively low in fat.

Actual Scores: 1-6

Average: 3.28



CARCASS

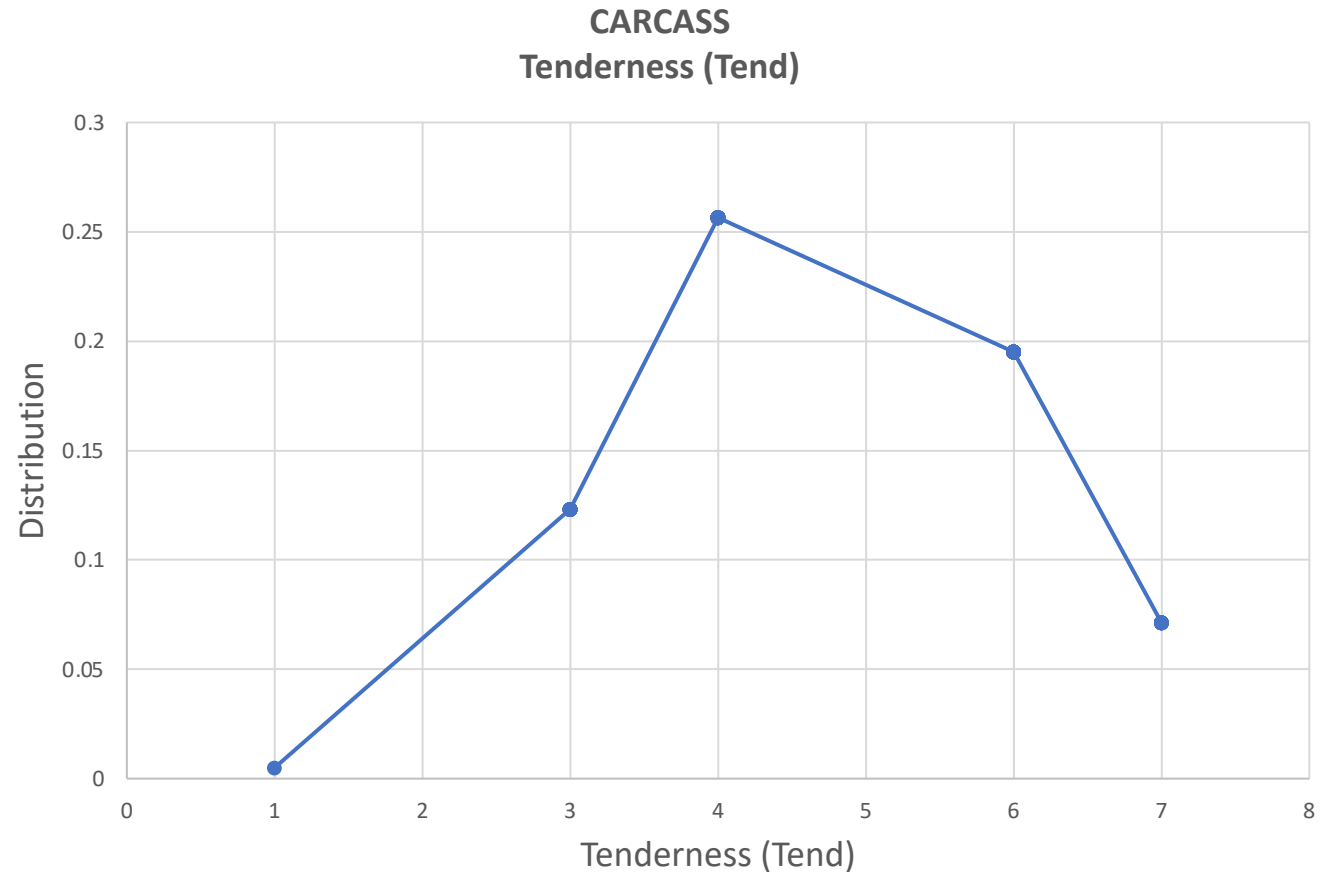
Tenderness (Tend)

Genetic potential for beef tenderness (Warner-Bratzler Shear Force). A higher 1-10 score is more tender.

We have seen, in the past, physical verification that bulls with low figures do leave tough meat in their offspring.

Bulls with a low tenderness trait should be avoided if a breeder is selling their own meat. In any event it would be good not to introduce a bull likely to produce tough meat in their offspring into the herd. If we can keep this trait high we will have a provable marketing advantage for our Highland beef.

Actual Scores: 1-7
Average: 4.76



CARCASS

Hot Carcass Weight (HCW)

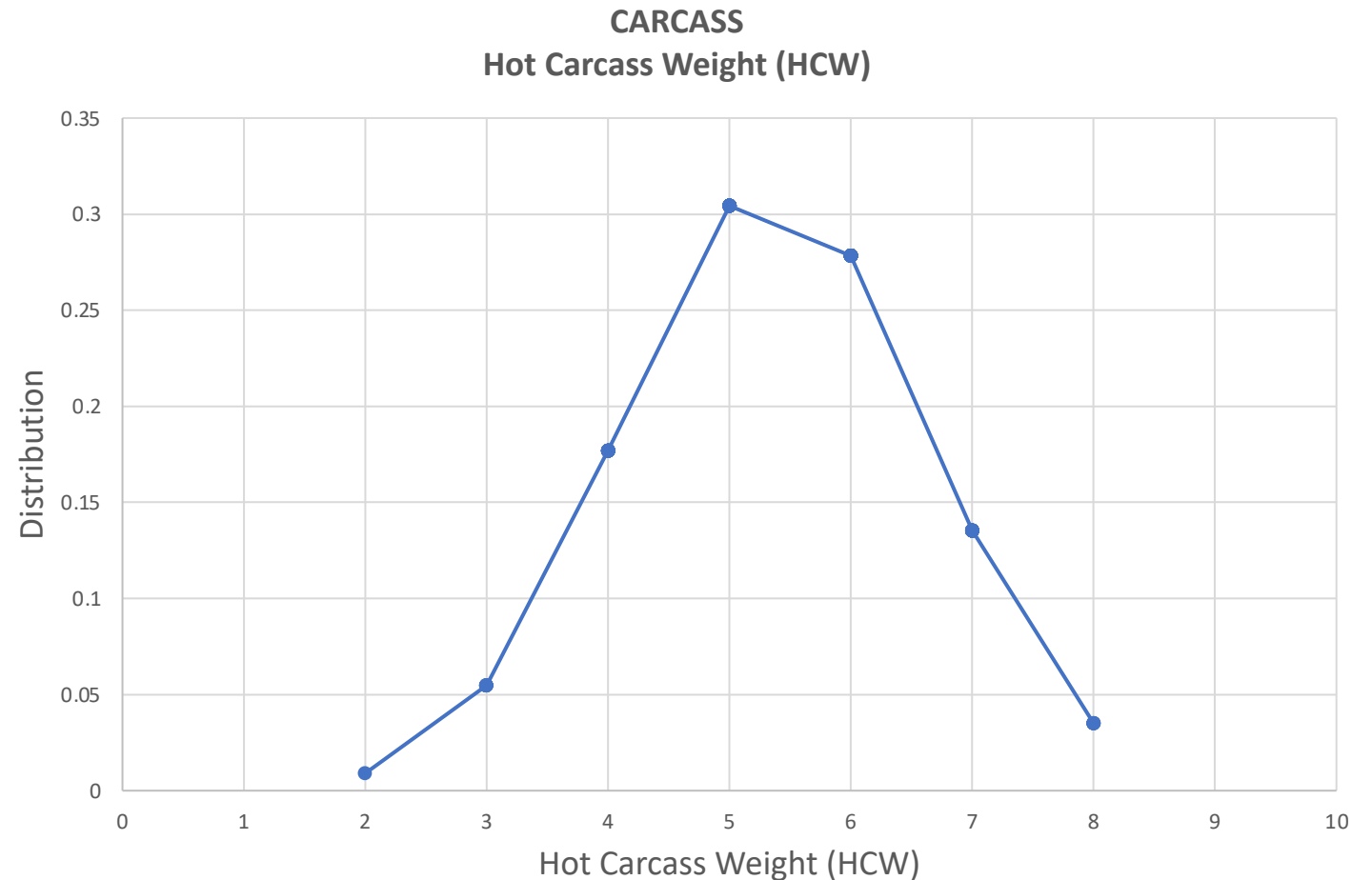
Un-chilled weight of a beef carcass. The higher the HCW, the greater the dressing percentage.

Improving this trait would be desirable across the herd, as it would improve our commercial desirability.

However, care should be taken, as we wish to protect the desirable Highlander traits and not produce Belgium Blues!

Actual Scores: 2-8

Average: 5.36



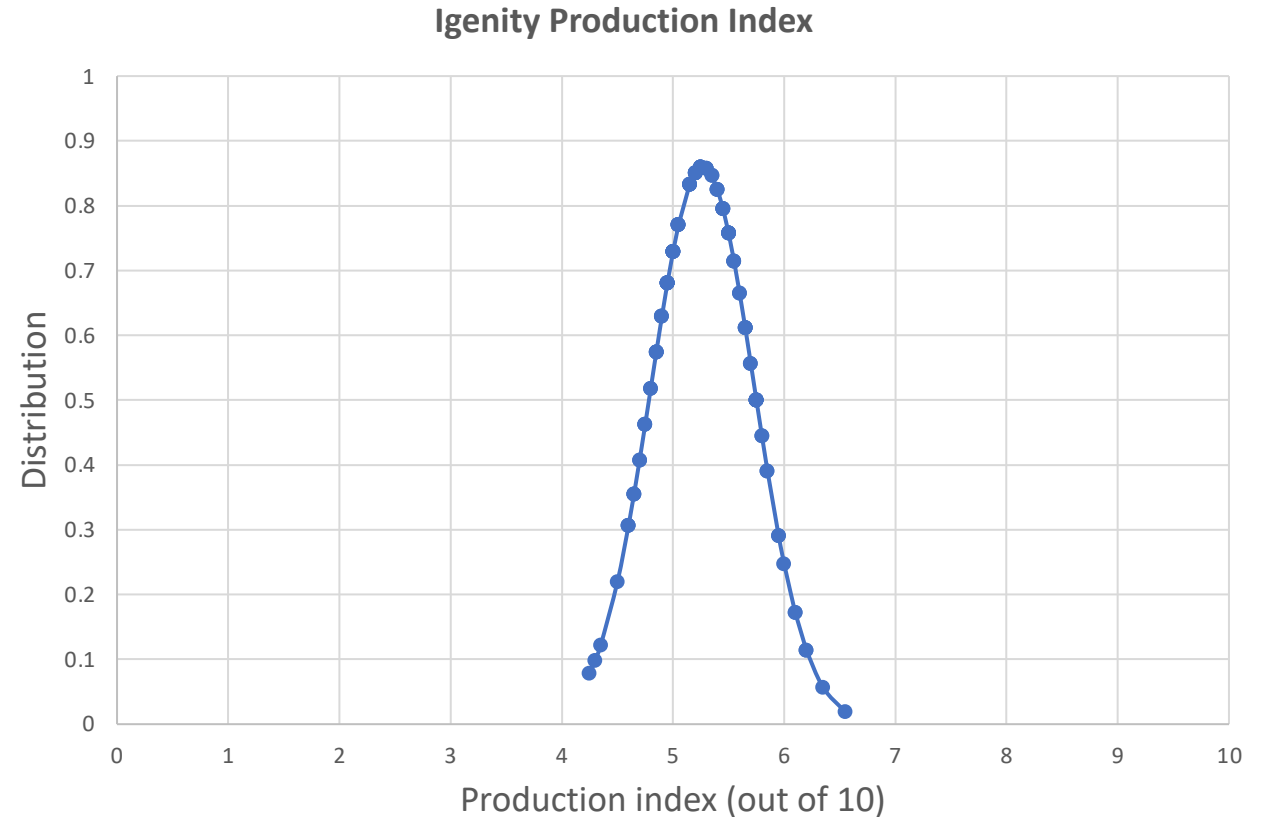
Igenity Production Index (IPI)

The Igenity Production Index is well balanced for maternal, production and carcass progeny traits. It is designed for producers who raise their own heifers and want broad improvement across multiple traits. Weightings: Stay 30%; CEM 10%; ADG 15%; RFI - 15%; Marb 20%; Tend 10%.

We believe the weightings on this index are a good way to get a general improvement across your herd.

The bulls tested this year fall into a normal distribution so selection from the right-hand side of the curve should give improvements across the herd.

GRAPH OF PRODUCTION INDEX.
(OUT OF POSSIBLE 10)
Actual Scores: 4.25-6.55
Average: 5.27



Data showing normal distribution of bulls registered during 2021

Igenity Production & Maternal Index (combined)

Data showing normal distribution of bulls registered during 2021.

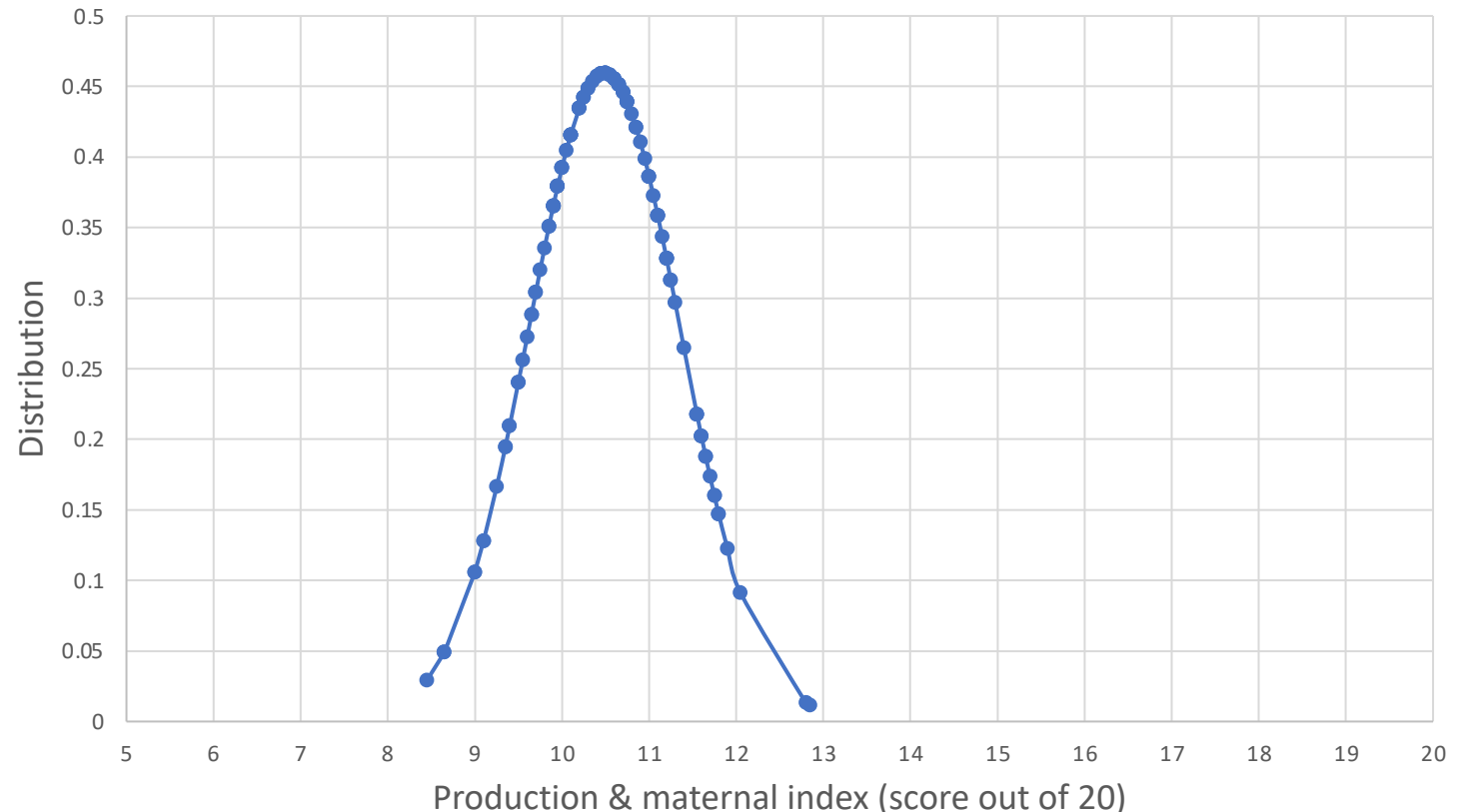
This index is not part of Igenity and we have used it as a way of sorting the results. As Highlanders are a maternal breed, combining the indexes may make sense for some breeders.

Selecting bulls from the right-hand side of the curve will help, in the future, to move the curve to the right and so improve the herd.

GRAPH OF PRODUCTION & MATERNAL
INDEX.
(OUT OF POSSIBLE 20)

Actual Scores: 8.45-12.85
Average: 10.49

Igenity combined scores of production & maternal index



Conclusions

Important!

All the above is the genetic potential of the animals. Environment, feeding, conformance to breed standard, locomotion, etc. will have as great an influence on the suitability of a breeding animal as its genetic potential.

However, it makes little sense to breed from bulls with a low genetic potential.

Now that we have tissue tagging, it is possible, by directly submitting the DNA to Neogen, to determine the potential of calves soon after they are born and keep for breeding only the calves with higher genetic potential. The remaining bull calves can then be cut and dehorned at an early stage, reducing stress and costs.

The selected bull calves can then be run on and then, by observation and management, selected to become stock bulls.