

# Ram buyer's guide

Using EBVs when selecting rams





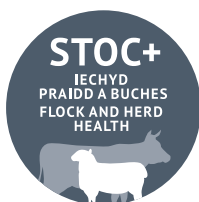
## About the project

This publication was produced as part of the Red Meat Development Programme (RMDP).


The RMDP encompasses three strategic projects: Stoc+, an animal health planning project; Hill Ram Scheme, a genetic improvement project; and Welsh Lamb Meat Quality Project, an eating quality project.



The aim of the programme is to ensure that the red meat sector in Wales is as resilient, sustainable and profitable as possible in an increasingly competitive global marketplace.

The RMDP is supported by the Welsh Government Rural Communities – Rural Development Programme 2014–2020, which is funded by the European Agricultural Fund for Rural Development and the Welsh Government.



# Contents

	<b>Introduction</b>	<b>4</b>
	<b>What are EBVs, accuracy values and indexes?</b>	<b>5</b>
	<b>How well do EBVs predict the true genetic merit of animals?</b>	<b>6</b>
	<b>Where to find sheep EBVs</b>	<b>7</b>
	<b>A new evaluation for hill sheep</b>	<b>8</b>
	<b>Interpreting EBVs</b>	<b>10</b>
	<b>Breed benchmarks</b>	<b>13</b>
	<b>‘Seek the standard’: making the search for top genetics easier</b>	<b>15</b>
	<b>RamCompare</b>	<b>16</b>
	<b>Using the terminal index on a Welsh hill farm</b>	<b>17</b>
	<b>Using the maternal index on a Welsh hill farm</b>	<b>19</b>
	<b>Finding the right ram breeder for your flock</b>	<b>21</b>
	<b>Build a breeding goal for your flock</b>	<b>22</b>
	<b>Genetic improvement and the environment</b>	<b>24</b>
	<b>Fit, fertile, profitable rams that work for you</b>	<b>25</b>
	<b>Conclusion</b>	<b>26</b>

Hybu Cig Cymru | Meat Promotion Wales  
Tŷ Rheidol, Parc Merlin, Aberystwyth SY23 3FF  
Tel: 01970 625050 Fax: 01970 615148  
Email: [info@hybucig.cymru](mailto:info@hybucig.cymru)  
Website: [meatpromotion.wales](http://meatpromotion.wales)  
 [facebook.com/HybuCigCymru](https://facebook.com/HybuCigCymru)  
 [twitter.com/HybuCigCymru](https://twitter.com/HybuCigCymru)

No part of this publication may be reproduced or transmitted in any form by any means without the prior written consent of the company. Whilst all reasonable care has been taken in its preparation, no warranty is given as to its accuracy, no liability accepted for any loss or damage caused by reliance upon any statement in or omission from this publication.

*Images: Meat Promotion Wales*



CYNLLUN  
HYRDDOD  
Mynydd  
HILL RAM  
SCHEME

## Introduction

Using animals with a known high genetic potential has been shown to be an effective and efficient way of improving on farm performance. Selecting breeding stock with a high index/Estimated Breeding Value (EBV) is widely recognised as the single most effective tool for increasing economic returns and efficiency of livestock production.

EBVs are an opportunity to make genetic progress in flock and breeds when used as a tool in sheep selection. Functional performance remains fundamental to selecting breeding stock.

There is no 'one-size-fits-all' approach to the types of sheep used in the UK, due to the stratified nature of the industry. To reflect this, each 'type' of sheep has their own index, to provide easy selection for the best performing animals within a breed and role.

Selecting rams that have been bred using genetic indexes will allow you to make improvements to the efficiency of your farm.

The purpose of this booklet is to:

- Provide an overview of EBVs and indexes to give an understanding of how to best use them
- Demonstrate the benefits of EBV based selection on commercial farms
- Provide a guide on different production and maternal traits and how to apply related EBVs to ram selection for your farm
- Provide a guide for setting breeding goals to use when selecting rams.

# What are EBVs, accuracy values and indexes?

## Estimated Breeding Values (EBVs)

EBVs are a prediction of an animal's genetic merit in specific traits.

To help you select the best rams for your system, EBVs can be used to identify a sheep's genetic potential regardless of its management. EBVs reflect the individual animal's performance. Therefore to predict the performance of the offspring, the ram's EBVs should be halved, as the other half of the genetics are from the maternal genes.

## How are EBVs calculated?

All flocks that performance record and produce EBVs have to collect detailed information about their sheep, including both physical and pedigree data. This includes:

### Physical

- Live weights (at birth, 8 weeks, 12 weeks, weaning etc.), lambing ease, ultrasound backfat scanning, ultrasound muscle depth scanning.

## Pedigree

- Sire and dam can be linked to the rest of the flock.

EBVs are calculated using a statistical programme called Best Linear Unbiased Predictor (BLUP), which uses all of the information provided to make a fair comparison between sheep even under different management.

BLUP groups animals together (e.g. sire, dam, management group, sex, age) and compares their performance to the overall and group average. The individual sheep's performance is compared to the average of its contemporary group and combined with the heritability to calculate its genetic merit (the EBV) in specific traits such as 8-week weight or ultrasound muscle depth.

Below average	Above average	EBV	Acc
		Litter size	0.25 86
		Maternal ability	2.39 95
		Eight-week weight	1.38 95
		Scan weight	6.37 97
		Muscle depth	1.41 92
		Fat depth	0.52 89
		Index	297 92

# How well do EBVs predict the true genetic merit of animals?

## EBV Accuracies

EBVs are not fixed values and may change over time as more information on a sheep and its family is collected and analysed.

EBVs are presented with an “accuracy value”. This reflects the confidence of the EBV – the higher the accuracy value, the closer the EBV is to the ‘true’ breeding value.

The more performance and pedigree data that is collected relating to the individual, the higher the accuracy value. Accuracy values can increase over time as additional measurements are collected.

The two rams in Figures 1 and 2 are father and son. The ram from Figure 1 has over 550 progeny on several commercial and pedigree farms. This means the evaluation has compared his progeny to that of other rams in a range of environments. The genetic merit can therefore be confidently evaluated, so he has a high accuracy value. His son (Figure 2) has ultrasound muscle and fat depth measurements and weights to compare with the rest of the flock, but he has no progeny yet, so his figures have a lower accuracy value.

When selecting rams and comparing animals, considering the accuracy of the EBVs is important.

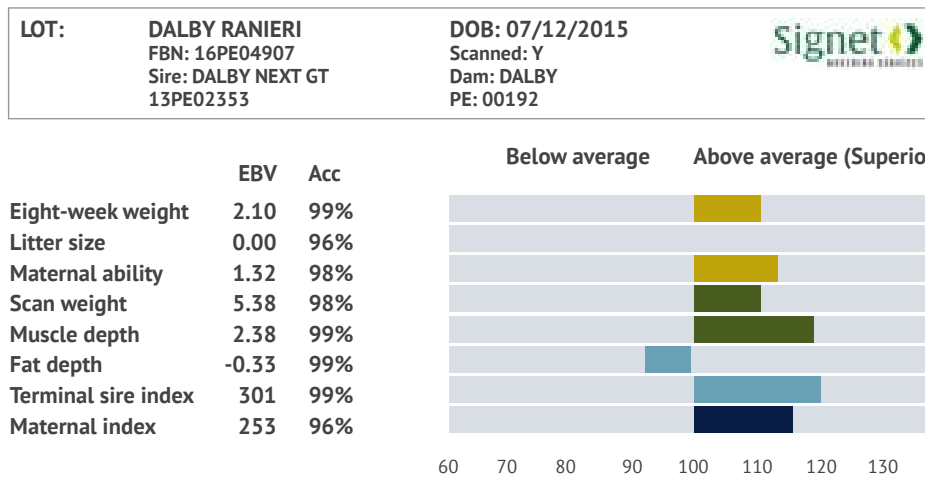


Figure 1. Dalby Ranieri RamCompare linkage ram

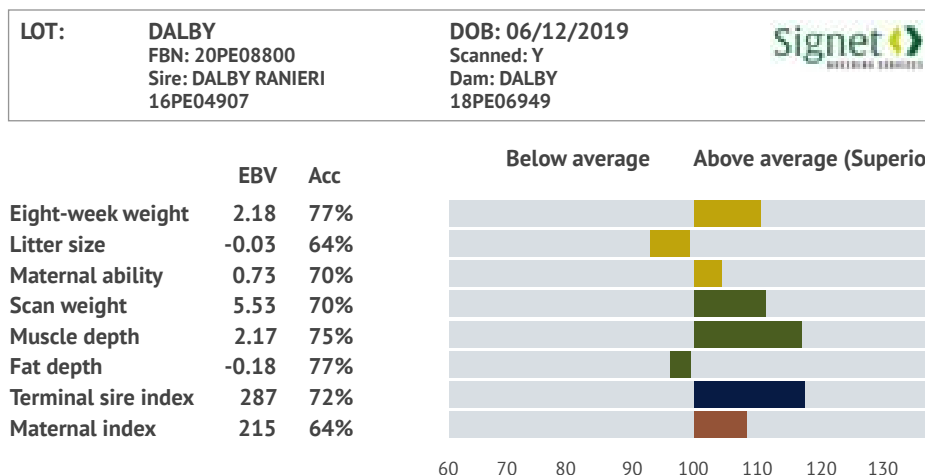


Figure 2. Dalby Ranieri 2020 son

## Where to find sheep EBVs

Farmers can find information on EBVs for breeding stock through various platforms, including the providers below and on sale cards at sheep sales.

Irrespective of the provider, EBVs are calculated using the same process (BLUP). Selection indexes using EBVs may vary with the breeding goals of the breed or provider.

To simplify selection, EBVs are combined to create an overall index score, which best reflects the role of a breed in the industry. In the index, traits are given a weighting according to their relative economic importance. Different breed types have an overall index; this allows an easy comparison to be made using just one number that reflects the overall genetic merit of the animal.

Provider	Website	Breeds
Signet (UK provider of EBVs)	Signetdata.com	Many recorded breeds in the UK
i-Texel	itexel.uk	Society Texels
Innovis	Innovis.org.uk	Innovis breeds
SIL (Sheep Improvement Limited) (NZ equivalent of Signet)	sil.co.nz	NZ Romneys Other imported NZ breeds



# A new evaluation for hill sheep

In 2020 the genetic evaluation services provided to hill breeds were relaunched with support from the Hill Ram Scheme which is part of the Red Meat Development Programme.

As a result:

- EBVs have been completely updated, rebased and are now produced on a monthly basis
- Carcase traits, like muscle and fat depth, are assessed on a weight (rather than age) adjusted basis to enhance the carcase attributes of hill lambs
- Breeding indexes have been updated to reflect the economic priorities on commercial hill farms
- New research has been initiated for traits such as lamb survival and ewe longevity
- Over 30 new hill flocks have signed up to start recording their lamb crop, increasing the impact of this important work and the choice for ram buyers.

Breeding values have never been more accessible, accurate or relevant to Welsh hill-sheep producers as they are today.

## Welsh Mountain Breed Benchmark for 2020

EBV	Attribute	Average	Top 25%	Top 10%
Eight-week weight	Growth to 8 weeks of age	0.4	0.87	1.28
Maternal ability	Milking ability	-0.01	0.13	0.25
Litter size reared	Number of lambs reared	0.01	0.03	0.05
Scan weight	Growth rate to scanning	1.16	2.17	3.08
Muscle depth	Muscling in the carcase	-0.07	0.38	0.79
Fat depth	Fatness / leanness	0	0.13	0.24
Hill index	Overall performance	127	156	182





# A new evaluation for hill sheep

When selecting stock on their index, it is important to understand the sheep system and identify desired areas for genetic improvement. These goals will be unique to each farm.

Index	Economic Goals	Main EBVs
Hill breeds e.g. Welsh Mountain, Beulah Speckled Face	<ul style="list-style-type: none"> <li>Rear more lambs to weaning</li> <li>Improve lamb survival</li> <li>Wean heavier lambs</li> <li>Improve ewe fertility</li> <li>Increase milking ability</li> <li>Improve carcase quality</li> </ul>	<ul style="list-style-type: none"> <li>Eight-week weight</li> <li>Muscle depth (Ultrasound scan)</li> <li>Fat depth (Ultrasound scan)</li> <li>Litter size</li> <li>Mature size</li> <li>Maternal ability</li> </ul>
Terminal sire breeds e.g. Suffolk, Texel, Charollais, Hampshire Down	<ul style="list-style-type: none"> <li>Fast-growing lambs</li> <li>Improved carcase quality</li> <li>Maintain easy finishing at a range of weights</li> </ul>	<ul style="list-style-type: none"> <li>Eight-week weight</li> <li>Scan weight</li> <li>Muscle depth</li> <li>Fat depth</li> <li>CT* lean weight</li> <li>CT* gigot</li> </ul>
Maternal breeds e.g. Lleyn, Romney, EasyCare	<ul style="list-style-type: none"> <li>Larger litter size (without becoming extreme)</li> <li>Improved milking ability of ewes</li> <li>Heavier lambs at weaning</li> <li>Maintain moderate mature weight</li> <li>Improve carcase quality</li> </ul>	<ul style="list-style-type: none"> <li>Litter size</li> <li>Maternal ability</li> <li>Eight-week weight</li> <li>Scan weight</li> <li>Mature size</li> <li>Muscle depth</li> <li>Fat depth</li> <li>Lamb survival</li> </ul>
Longwool breeds index e.g. Bluefaced Leicester	<ul style="list-style-type: none"> <li>Improved growth of lambs</li> <li>Improved milkiness of ewes</li> <li>Maintain prolificacy</li> <li>Improve carcase quality</li> </ul>	<ul style="list-style-type: none"> <li>Eight-week weight</li> <li>Scan weight</li> <li>Maternal ability</li> <li>Litter size</li> <li>Muscle depth</li> </ul>

\*CT – Computer Tomography

# Interpreting EBVs

## How to interpret EBVs

EBVs can be displayed in different ways, and can be used to compare a sheep to the rest of the breed or group.

### **EBV units are based on the measured trait e.g. live weight (kg)**

Charts are easy to use with detailed figures included in catalogues and online databases, which allows specific selection using the breed benchmark.

Check the date on the chart is the most recent analysis for the current year.

## EBV charts

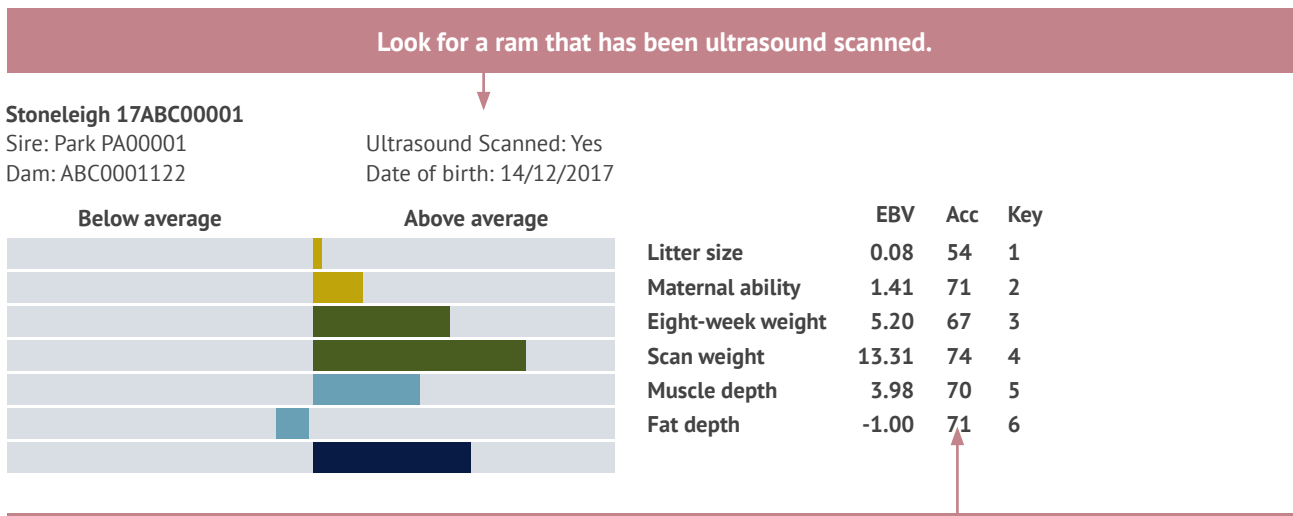
EBV charts give a quick graphical guide to the genetic merit of an animal. The direction and size of the bar can be used to compare animals to the rest of the breed.

The centre line represents the breed average for that trait. The bars displayed on the right-hand side are above average and the trait is increasing in value, reflected by the length of the bar. The size of the bar shows the accuracy and degree of performance in a trait. It is important to remember that these figures are halved when passed onto a ram's progeny.



# Interpreting EBVs

## EBV sale charts



**Accuracy values are percentage figures. The higher the figure, the more accurate the EBV. They indicate how much information has been used to calculate an animal's EBVs.**

1. A ram with an EBV of +0.08 is estimated to produce ewes which produce 4 per cent more lambs than a ram with an EBV of 0.
2. A ram with an EBV of +1.41 is estimated to produce ewes whose lambs are 0.70kg heavier at eight weeks of age than a ram with an EBV of 0.
3. A ram with an EBV of +5.20 is estimated to produce lambs which are 2.60kg heavier at eight weeks of age than a ram with an EBV of 0.
4. A ram with an EBV of +13.31 is estimated to produce lambs which are 6.65kg heavier at 21 weeks of age than a ram with an EBV of 0.
5. A ram with an EBV of +3.98 is estimated to produce lambs with loin depths 1.99mm deeper at 21 weeks of age than a ram with an EBV of 0.
6. A ram with an EBV of -1.00 is estimated to produce lambs with 0.50mm less fat across the loin at 21 weeks of age than a ram with an EBV of 0.

# Interpreting EBVs

## Individual EBVs explained

EBVs	Importance	Measure
<b>8-week weight EBV</b>	This is a measure of the animal's genetic potential for growth from birth to weaning at 8 weeks.	A ram with an EBV of +3 for 8-week weight is expected to produce lambs which, on average, are 1.5kg heavier at weaning compared to lambs sired by a ram with an EBV of 0.
<b>Scan weight EBV</b>	This is a measure of the animal's genetic potential for growth from birth to 21 weeks of age (age at scanning). Selection for high scan weights results in animals that will have heavier carcasses at a constant fat class or leaner carcasses at a constant age.	A ram with an EBV of +4 for scan weight is expected to produce, on average, lambs 2kg heavier at 21 weeks than lambs sired by a ram with an EBV for this trait of 0.
<b>Muscle depth EBV</b>	This is an assessment of loin ultrasonic muscle depth and therefore likely lean meat yield.	A ram with an EBV of +1 for muscle depth is expected to produce, on average, lambs with 0.5mm greater eye muscle depth at a fixed weight compared to lambs sired by a ram with an EBV of 0.
<b>Fat depth EBV</b>	Negative values indicate animals with lower ultrasonic backfat levels, which will produce leaner carcasses or which can be taken to heavier weights without becoming overfat.	A ram with an EBV of -1.0 for fat depth is expected to produce, on average, lambs at a fixed weight with a subcutaneous fat thickness 0.5mm less than lambs sired by a ram with an EBV of 0.
<b>Mature size EBV</b>	Positive figures identify breeding lines that will be bigger at maturity. In certain hill breeds, even though it is advantageous to enhance lamb growth rates, it may be desirable to restrict increases in the mature size of the ewe.	A ram with a mature size EBV of +0.3 is expected to produce ewes that will be, on average, 0.15kg heavier at maturity than the average ewe.
<b>Maternal traits</b>	Many traits are expressed by both sexes (e.g. growth rate and muscling), but maternal traits (e.g. litter size and maternal ability) are only expressed by females.	A ram's maternal EBVs, when halved, provide an indication as to how his female offspring will perform when they become mothers.
<b>Litter size born EBV</b>	This figure is based on the litter size the animal was born into, i.e. twin or single, and how prolific its own female progeny is then likely to be (more likely to bear twins or singles).	A ram with a litter size EBV of +0.3 is expected to produce ewe lambs that will have, on average, 0.15 more lambs than ewes from a ram with an EBV of 0.
<b>Maternal ability EBV</b>	This is the maternal component of the 8-week weight measurement. It gives an indication of how well a ram's ewe lambs will perform as mothers. A ewe's EBV for maternal ability estimates how much of its lambs' performance up to eight weeks of age is due to maternal characteristics such as milkiness and maternal care of the lamb.	A ram with a maternal ability EBV of +0.5 is expected to produce ewe lambs that will have above average maternal characteristics leading to their lambs being 0.25kg heavier at 8 weeks than lambs from ewes sired by a ram with an EBV of 0.
<b>Lambing ease EBV</b>	This gives an indication as to how easily the animal itself was born and how likely its progeny will lamb unassisted.	A ram with a lambing ease EBV of +0.08 will sire lambs that require 4 per cent fewer assists at lambing than a ram with an EBV 0.
<b>Birth weight</b>	This gives an indication of the birth weight of the animal.	A ram with a birth weight EBV of +0.45 will sire lambs which are estimated to be 0.22kg heavier at birth than lambs sired by a ram with an EBV of 0.
<b>Lamb survival</b>	This trait gives an indication of the proportion of lambs which are born alive that survive up to eight weeks or to scanning weight.	A ram with an EBV of +0.1 will sire lambs which an extra 5 per cent born alive will be alive at weaning compared to a ram with an EBV of 0.

## Breed benchmarks

Breed benchmarks help compare rams within a breed; these rank their relative performance. In any group of sheep, most will tend to perform around the average, with a few animals having extremely high or low performance as shown in Figure 3. The aim is to pick sheep that have EBVs above average; this can be done by identifying those in the top 10% or 25% of the breed.

EBV figures are found on databases, breed reports, in catalogues and also printed charts at ram sales. To assess how a sheep compares to the rest of the breed, use the breed benchmark.

Each year the breed benchmark is updated to include the values of the previous year's lamb crop. With continued genetic selection, genetic merit will progressively improve and the top 10% value will eventually become the average value of all animals as the breed progresses (see Figure 3).

In other words, the whole graph shifts to the right over time. It is important to compare animals to the most recent benchmark using the most recent EBVs, so the evaluation includes the most up-to-date information. Using old information to evaluate a ram may lead to an overestimation of how it compares to the rest of the breed, so make sure you use the most recent data/benchmark.

Rams can be selected just on their overall index score, but farmers should also consider the individual trait EBVs and select animals best suited to improve key elements for their flock. Rams don't need to be the best for every trait, but to make progress the ram should be above the average for the breed and better than previous rams used on the farm. It is beneficial to balance the 'complete' ram in several traits, rather than select a ram that is exceptional in one trait.

These EBVs are expressed in real units of measurement, so this ram has the breeding potential to be 8.85kg heavier at scanning time, with over 2mm more muscling across the loin compared to a ram with EBVs of 0.

This information might be shown in a sale catalogue as follows:

<b>Stoneleigh Perfection</b>	<b>UK524429</b>	<b>ABC11001(E)</b>	<b>Born: 01/01/2017</b>					
<b>Sire: COVENTRY OXYGEN XYZ08019(E) by FRANKTON FRE (1)</b>								
	Litter size	Maternal ability	8-week weight	Scan weight	Muscle depth	Fat depth	CT gigot muscle	Index
EBVs	0.15	0.14kg	4.82kg	8.85kg	2.18mm	0.21mm	2.93mm	282
Accuracy	28%	25%	88%	90%	86%	88%	78%	89%

# Breed benchmarks

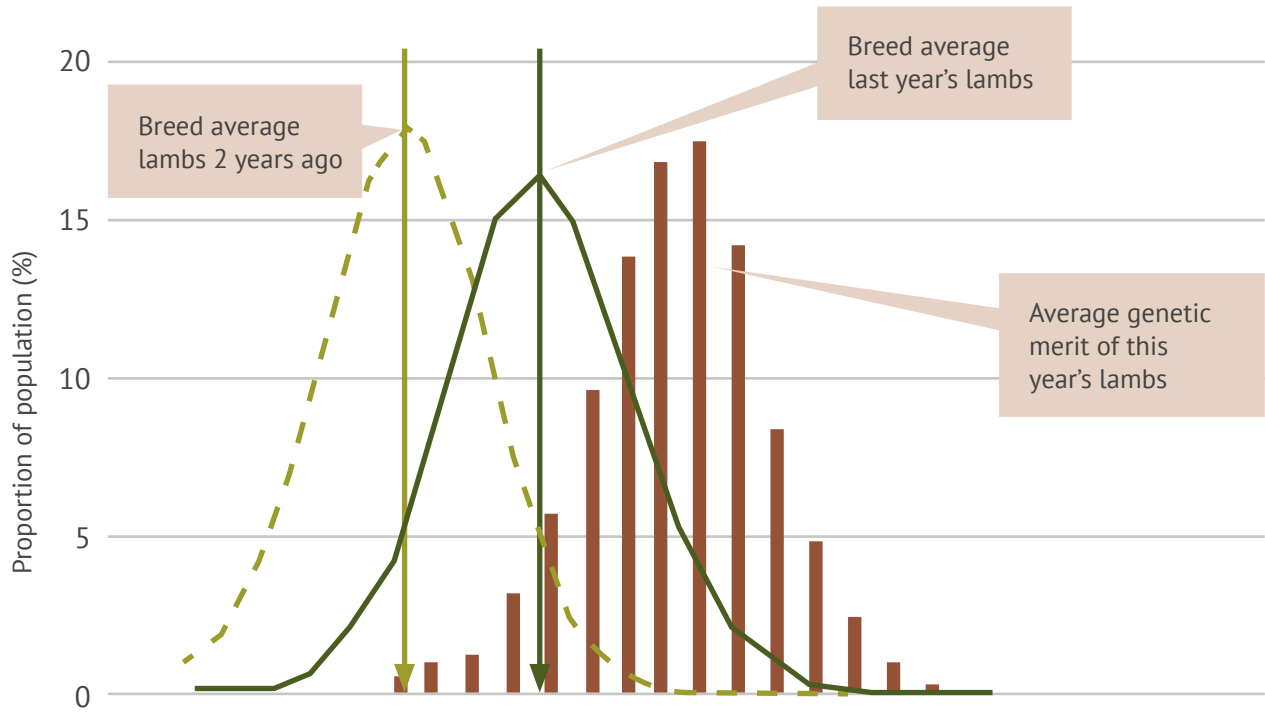


Figure 3. Variation in genetic merit in a population



## ‘Seek the standard’: making the search for top genetics easier

‘Seek the standard’ is a campaign to help buyers quickly and easily spot rams with the top genetic merit, based on their index value.

The index breed benchmarks are used to set standards:

- **Gold plus: top 5%**
- **Gold: top 10%**
- **Silver: top 25%**

These coloured tags show the ‘standard’ of performance-recorded rams and can be tied around the necks of rams at sales, to make spotting high genetic merit rams easy in the sale ring.

When you have seen a ram of the desired genetic merit, check the ram’s ear tag and review the individual EBVs with the breeder. Often at sales, charts will be presented, allowing you a more detailed assessment of an animal’s genetic merit. You can also quickly search for an animal or breeder on [signetdata.com](http://signetdata.com).



# RamCompare

The RamCompare project, funded by HCC, AHDB, QMS and other commercial industry partners, involves recording progeny lamb performance data from performance-recorded terminal sire rams on nine different commercial sheep farms across the UK.

This has shown that the EBVs calculated for terminal sire breed can be used to select rams that will sire progeny on commercial farms and result in:

- increased growth rates from birth to slaughter,
- earlier finishing lambs,
- improve carcase quality and carcase weights.

These are key drivers for increased farm profit: the benefit from selecting a high performing sire easily achieves an additional £3-£5 per lamb and in some cases can be well over £5 per lamb. These calculated benefits are purely based on the improved carcase value and do not account for the difference in days to slaughter between sires of up to 60 days.





# Using the terminal index on a Welsh hill farm

## Rhys Edwards, Hendre Ifan Goch – Case study 2020

### Using tools to fine-tune management decisions

Rhys Edwards and his father, Russell, farm at Hendre Ifan Goch in Bridgend, south Wales. Together they run their 101ha hill farm with their commercial White-faced Mule ewes.

This father-son team aim to keep costs to a minimum to remain profitable and have invested time, effort and money to improve the infrastructure and ensure their system works efficiently. Rhys is constantly monitoring and analysing performance of their lambs and grassland, to aid management decisions.

This constant monitoring helps to understand areas that can be improved on the farm. It was this enthusiasm and drive to improve efficiency that led them to join the UK industry progeny test – RamCompare ([meatpromotion.wales/en/industry-resources/research-and-development/current-projects/ramcompare](http://meatpromotion.wales/en/industry-resources/research-and-development/current-projects/ramcompare)).

Rhys Edwards said, **“We wanted to be part of RamCompare to see if EBVs (Estimated Breeding Values) actually work in a commercial farm environment. There is a lot of misunderstanding around figures, so we wanted to put them to the test with thorough data analysis on our farm.”**

### How have EBVs aided improvements at Hendre Ifan Goch?

Joining the project in 2017, Rhys wanted to:

- Get lambs away quickly with more carcasses achieving market specification
- Achieve a premium for high value carcasses.

Over two years, Hendre Ifan Goch has used 20 different rams producing 1,000 lambs with full data recorded from birth to slaughter. Lambing indoors in March, the lambs are treated the same, running as one group throughout the season. Lambs are sent to slaughter in batches every two weeks from around 12 weeks of age. High sugar grass leys are used to finish the lambs.

### Earlier lamb sales by reducing days-to-slaughter

In 2019, there was a difference of 61 days between sires in the average number of days to slaughter of their progeny, so selecting the right rams can significantly reduce feed costs over a lamb crop.

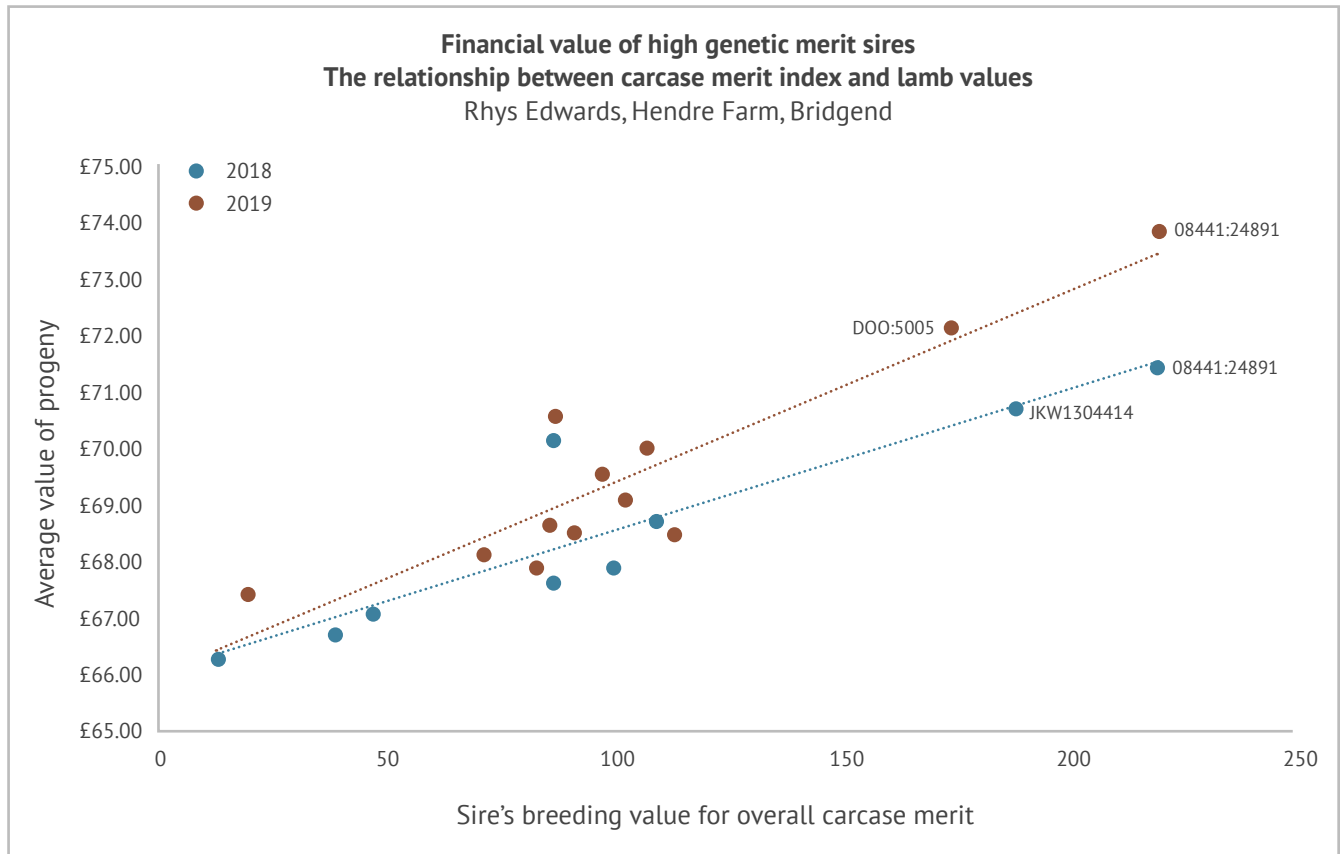
While only RamCompare tested rams have a Days-to-Slaughter EBV, all performance-recorded rams have a Scan Weight EBV and this is a very good predictor for days to slaughter.

### Economic impact

The graph overleaf shows carcass value, over two years the highest ranked rams gave a benefit of £4 compared with the lowest ranked rams. All of the sires in RamCompare were top 20% rams, so within the top performing recorded rams. Selection breeding will lead to a significant economic difference and there are even greater gains to be made compared to unrecorded rams.



# Using the terminal index on a Welsh hill farm



Rhys concludes, “In just two years, we have seen massive benefits. From two rams of the same breed, we have seen a difference of price in the pocket of £5.55 per lamb, whilst treated under the same conditions. It definitely adds up over a group of lambs.

“We now believe we can choose a ram based on figures (breeding values) and have confidence that he will provide lambs who grow quickly off grass, grade well, and be sold from our hill farm by the end of October.”

**Key points:**

- Review your sheep enterprise to set your improvement objectives
- High Scan Weight EBVs are a reliable predictor for reduced days to slaughter
- Selecting for EBVs influencing both growth and carcass traits will increase potential carcass weights and grades.

# Using the maternal index on a Welsh hill farm

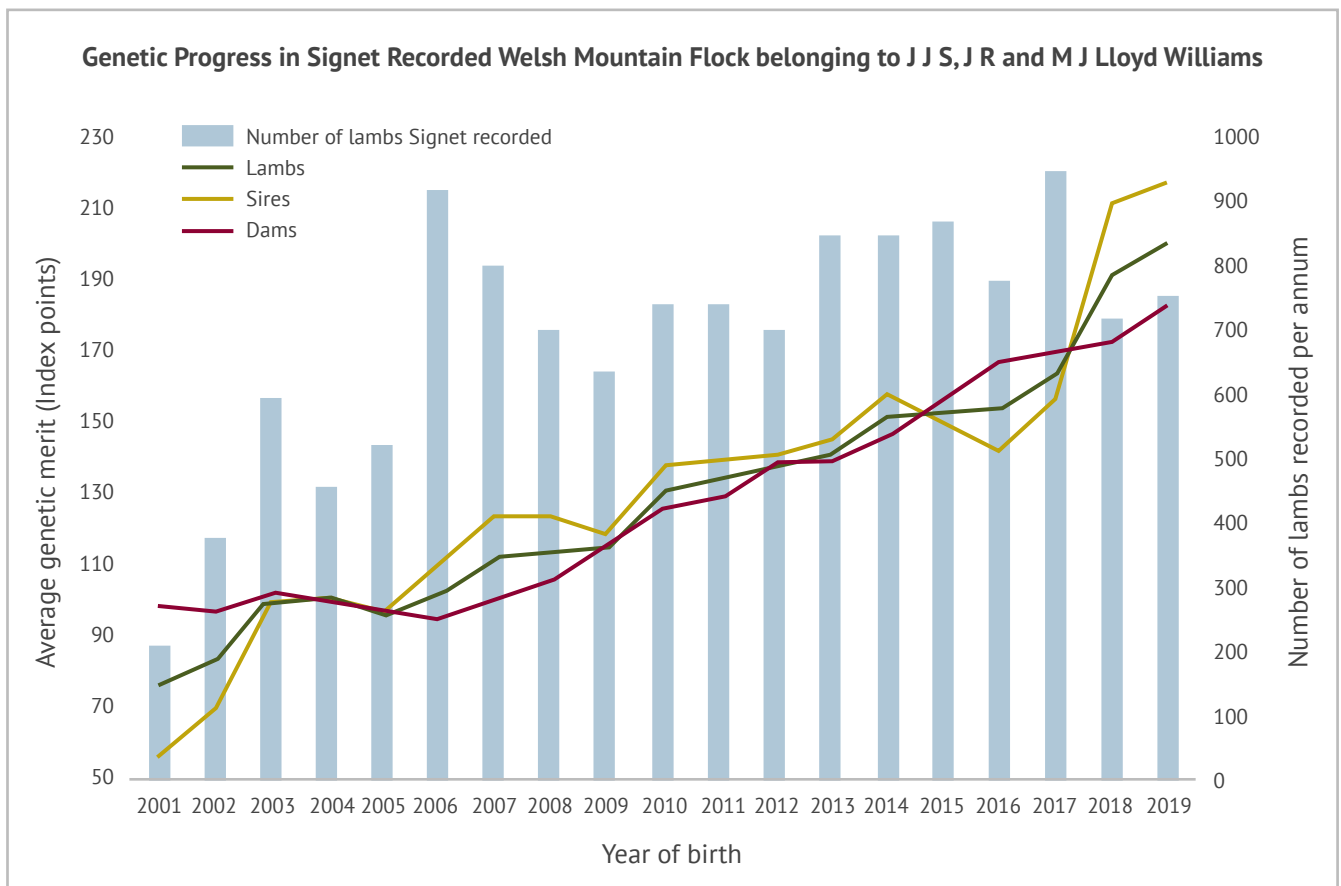
## Welsh case study – maternal sire

One flock that has been working hard to optimise performance on the hill is father and son team, Simon and Rhodri Lloyd-Williams. They farm at Moelgolomen, in north Ceredigion on 750 acres of mostly hill, ranging from 600 feet at the lowest point up to 1500 feet. All ewes lamb outside from the end of March and through April. All the lambs which are not kept for replacements are sold deadweight, or through their private boxed lamb scheme. In 2019, over twenty performance-recorded rams were sold through a combination of a specific performance-recorded ram sale, private sales and through their local Dolgellau ram sales.

## Genetic improvement on the hill

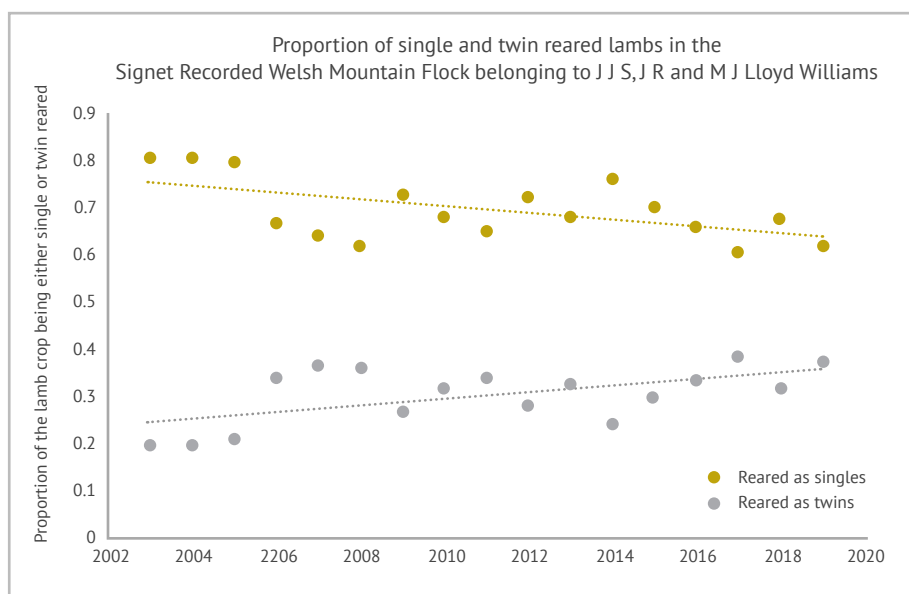
The flock has made significant strides in increasing its genetic merit, as can be seen in the chart below. The advantage of their breeding programme is the large number of animals recorded, meaning each ram has many tested progeny, with the average sire having 90 lambs recorded over his lifetime.

The chart highlights challenges when bringing in new male breeding lines. Historically, access to new recorded genetics was often limited and this slowed down genetic gains achieved through sire selection.



**Figure 4.** Genetic progress in Signet Recorded Welsh Mountain Flock belonging to J J S, J R and M J Lloyd Williams

# Using the maternal index on a Welsh hill farm



**Figure 5.** Proportion of single and twin reared lambs in the Signet Recorded Welsh Mountain Flock belonging to J J S, J R and M J Lloyd Williams

	Singles		Twins	
	Number of lambs weighed	Average 8-week weight (kg)	Number of lambs weighed	Average 8-week weight (kg)
2003–2007	1655	12.46	542	11.54
2016–2019	1874	14.65	1043	12.70

**Table 1.** Average eight-week weight at the beginning of performance recording and after 10 years of progress for single and twin reared lambs

## What does this genetic gain mean in terms of performance?

The most striking change over time has been the increase in the number of lambs sold from the flock. Since recording began on their farm in 2001, the proportion of single reared lambs has declined from around 80% to around 65%, with a rise in the number reared as twins.

At the same time, improvements in milk production and early lamb growth rates have led to an increase in eight-week weight, an early indicator of lamb performance linked to both lamb survival and eventual lamb sale weights. Although there are year on year fluctuations, as with any hill farm, the rolling averages show a significant increase in the weight of both single and twin reared lambs.

## Key points

Selecting sires for breeding with superior EBVs will lead to more productive daughters being retained:

- High Maternal Ability EBVs – greater milk production and maternal care
- High Litter Size EBV – more lambs produced
- High Eight-week Weight EBV – faster lamb growth rates.

Breeding indexes are useful when selecting for more than one trait at a time.

# Finding the right ram breeder for your flock

When looking for a new ram, it is important to consider the rearing system and the breeding objectives of the vendor.

## Important things to discuss with ram producers

- What are the genetic trends of the flock?
  - Breeders should demonstrate that they are making progress and improvements to their flock year on year.
  - Discuss your breeding goals with ram breeders to see if they are similar.
  - Ask them if they have any data displaying the genetic improvement of their flock.
  - How does the breeder's progress compare to the rest of the breed?
- How does the breeder's production system compare to your own system?
- What selection pressure does the breeder apply, including culling policy?
- What is the disease status of breeder's flock?

## What health screening protocols, biosecurity procedures and vaccination programmes are in place?

- Some farmers are willing to give warranties on their rams. This may include warranties such as if they are infertile or die of natural causes soon after arriving on farm.
- To get the best performance out of your newly purchased rams, ensure that the bought-in rams are quarantined on farm for at least 6 weeks before mating.

## Help in finding a breeder

On Signetdata.com there are features allowing farmers to search for performance-recorded animals for sale, along with performance-recorded flocks which are nearby.

To find sheep for sale, go to the Sheep for Sale Search – [signetdata.com/sheep-search/search-sheep-for-sale/](https://www.signetdata.com/sheep-search/search-sheep-for-sale/)

Other providers have information on their websites to help with finding a breeder. Examples include [itexel.uk](https://www.itexel.uk), [Innovis.org.uk](https://www.innovis.org.uk)

# Build a breeding goal for your flock

To improve performance, it is important to use your current flock output to identify areas for potential genetic improvement.

Prioritise areas that will have the biggest financial gain, and assess how genetics can be used to improve your flock's performance. This will help to select the criteria of your next ram to achieve the fastest progress. Also consider how quickly the improvement needs to be made.

To help find your future rams, you can use a breeding goal builder to help define which EBVs/traits you want to select for your sheep system.

## Breed objective builder

Using your own farm performance, you can identify areas that you feel are the most important to improve. Use your objectives to set key EBV criteria of ram purchases.

Farm performance	On-farm performance	Satisfactory (yes/no)	Priority (1,2 or 3)	EBVs to target
Lambing percentage				<ul style="list-style-type: none"> <li>Litter size</li> <li>Birth weight</li> <li>Lambing ease</li> </ul>
Rearing percentage				<ul style="list-style-type: none"> <li>Litter size</li> <li>Lambs reared</li> <li>Lamb survival</li> </ul>
Weaning weight				<ul style="list-style-type: none"> <li>Eight-week weight</li> <li>Scan weight</li> <li>Maternal ability</li> </ul>
Sale weight (kg)				<ul style="list-style-type: none"> <li>Scan weight</li> </ul>
Deadweight (kg)				<ul style="list-style-type: none"> <li>Scan weight</li> <li>Muscle depth</li> <li>Fat depth</li> </ul>
Ewe mature weight				<ul style="list-style-type: none"> <li>Mature weight</li> </ul>
Scanning percentage*				<ul style="list-style-type: none"> <li>Litter size</li> </ul>

\*Scanning percentage has a large environmental influence, which will account for large swings in scanning percentage. Genetic selection for improved litter size will help to gradually increase the average despite the environment.

# Build a breeding goal for your flock

## Use your breeding objectives to aid ram selection:

Once you have identified the key performance area(s) that you would like to improve – use the key traits to select the rams with the EBVs you require. Remember that finding rams that excel in all traits is very rare. Be prepared to select rams that are strong in all your desired traits, not just exceptional in one or two.

Measuring the performance of your whole sheep enterprise can help to identify overall areas for improvement. Monitoring the performance of individual rams using their progeny will help identify the rams that are working well for you.

## 5 Steps to using EBVs to select your rams

1. **Identify** the role of the rams selected – What do you expect from the progeny? This will help you to select the best breed and index to use for your farm.
2. **Record** existing farm performance of lambs and ewes.
3. **Decide** breeding goals based on your on-farm performance. Pick traits to improve and maintain. Use the relevant EBVs to select the most suitable ram.
4. **Select** a breeder that matches your goals, health status and farming system.
5. **Select** rams that fit your chosen EBVs.

**Remember, genetic improvement of sheep enterprises by purchasing performance-recorded rams, on the basis of their index or individual EBVs, is not just for the elite but for all commercial sheep farmers. It will improve overall flock performance and profitability!**



# Genetic improvement and the environment

## Impacts of sheep on the environment

Improving the use of resources (feed and land) by becoming more efficient overall is a win-win scenario for both the environment and farm businesses.

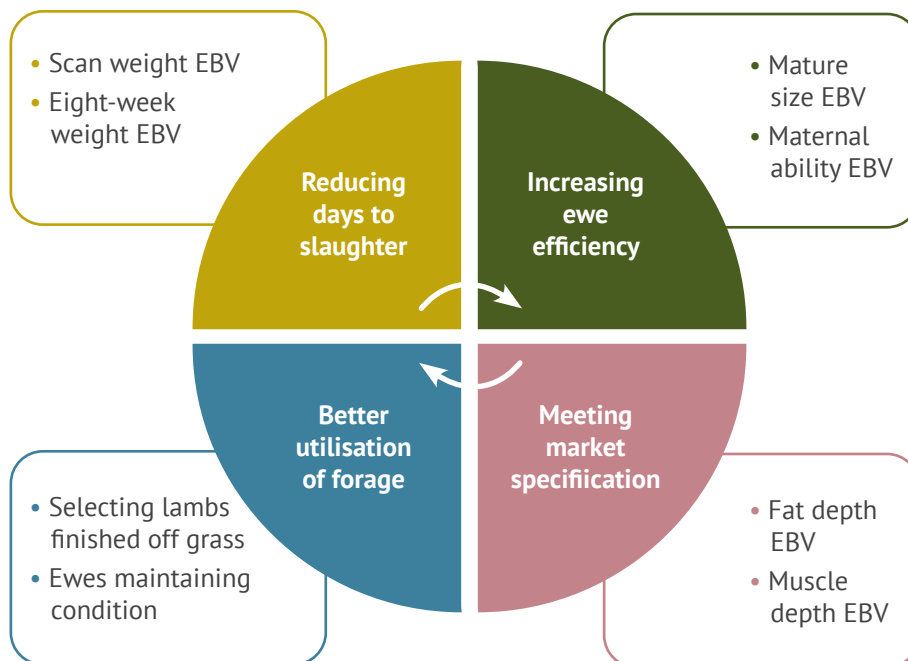
Improving efficiency can both increase the output from the same amount of resources and also reduce waste (gas emissions and plastics). This increases both on-farm production and profitability.

Sheep often graze land that cannot otherwise produce food and are a crucial part of Welsh agriculture.

They also have an important role in managing land for biodiversity; grazing land promotes soil fertility and wildlife. Sheep can graze marginal land areas to produce high-quality protein in the form of lamb.

Genetics have a key role to play in increasing sheep efficiency and improving their environmental impact. Many Welsh sheep breeds are well adapted to their environment. Selecting for the best performing animals is best for the environment and farm profitability.

## How do genetics relate to improving environmental impact?



It is important to differentiate between maternal sires and terminal sires. Maternal/Hill sires contribute significantly to ewe efficiency and performance when selecting replacement ewes. Terminal sires are bred for fast growth and improved carcase quality traits, using the scan weight, fat depth and muscle depth EBVs.

The widespread use of performance-recorded rams to improve overall flock performance will allow the environmental footprint to be reduced.



# Fit, fertile, profitable rams that work for you

## Rams that work

EBVs are about selecting the rams that will add the most value to their progeny from improved genetics. Another crucial part of ram selection is how well a ram can do its job. If a ram is physically incapable of being able to mate a large number of ewes, this can outweigh the benefit from improved genetics.

Selecting fit for purpose rams is an important part of ram selection when you choose a ram. Ensure that you get the best value for rams by checking they hit key performance indicators:

Active years on farm	4+ years
Mating ratio (ewes per ram)	50–100 ewes
Lambs reared/ram/year	70+
Lifetime lamb output per ram	70+
Ram cost/lamb	<£2/lamb

These benchmarks will be unique to each farm and vary between systems but aim for a ram to produce 300+ lambs in his lifetime.

## The cost of longevity and ability to work

Increasing the number of lambs produced by a ram is a simple way to increase efficiency, reducing the cost per lamb produced.

See table below for the potential savings by using a fit, fertile and profitable ram.

Number of years working	Ewes served per year*			
	40	60	80	100
Cost/lamb (£)				
1	9.4	6.3	4.7	3.8
2	4.7	3.1	2.3	1.9
3	3.1	2.1	1.6	1.3
4	2.3	1.6	1.2	0.9

\*£600 ram at rearing rate of 1.6 lambs per ewe served

Easy ways to increase the lambs produced by a ram:

- Increase number of ewes mated per year
- Increase years working on the farm.

Evaluation of health, fitness and structural soundness is crucial when buying rams. Buy rams from farms that are already using high ewe to ram ratios.

Rams reared on forage-based systems tend to have higher longevity and a better ability to work.

Further information on a year-round approach to ram management is available in the HCC publication, 'Fit, Fertile and Profitable'.

## Conclusion

There are many things to consider when choosing your next stock ram. These can be largely split into two factors: the physical soundness (the ability of a ram to do his job as assessed by you) and the value added to his progeny through improved genetic merit, assessed using EBVs.

Indexes and EBVs mean you can assess the genetic merit of rams in important performance traits. These are easy to compare, independent and allow selection in traits that can be hard to measure (worm resistance, milking ability and lamb survival).

Always using superior rams means that you can continuously improve the performance of your flock by reducing your costs, improving your output, helping your profitability and reducing environmental impact.

The selection between rams with the top genetics can result in a difference in carcase value of £5 per lamb. (according to RamCompare data). Getting ram selection right can make a big impact on your profit.

To make best use of EBVs, use your own flock performance data and establish some simple breeding goals. Apply these to EBV-based selection to find rams that complement your system.

Ram selection requires comparisons and decisions to be made between rams. EBVs are a tool to make these decisions easier, but should be used along with your own knowledge, judgement, experience and physical assessment of rams.

### The choice is yours...

- You choose which EBVs are important to your sheep enterprise.
- You decide the compromise you are comfortable with in terms of the performance/EBV data and the animal you're looking at.
- You select your next ram.

### Further information

Please contact HCC's Industry Development team  
Tel **01970 625050**

Email **info@meatpromotion.wales**

For further information on this booklet  
or the work of HCC please visit  
**www.meatpromotion.wales**

