PERFORMANCE RECORDED TERMINAL SIRES – BRED FOR COMMERCIAL SHEEP PRODUCTION

Signet ❬❭
BREEDING SERVICES

CONTENTS

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BREEDING SHEEP THAT ARE WORLD CLASS

For over 40 years, flocks have engaged in industry research and performance recording to enhance the performance of terminal sired lambs. Across many of the terminal sire breeds this has been very successful, lifting genetic potential for growth by up to 6 kg and enhancing carcase yield.
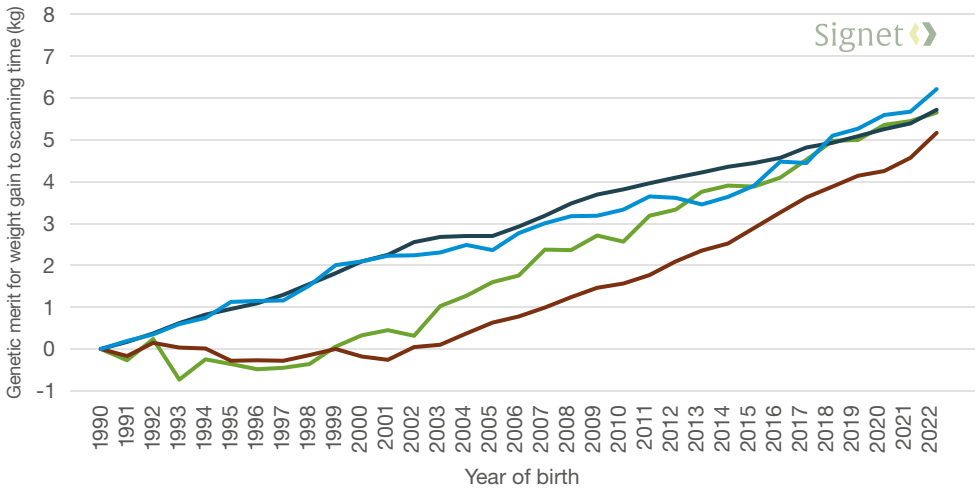
Signet ◀▶

Source: Signet

— Suffolk   — Charollais   — Dorset   — Hampshire Down

Data from the national progeny test, RamCompare, enhances breeding values and identifies the most valuable terminal sires based on their breeding values for abattoir traits:

❯ Days to slaughter

❯ Carcase conformation

❯ Overall carcase value

These achievements don't arise by chance but through selective breeding using the best genetic tools available.

WHAT DOES THIS MEAN FOR COMMERCIAL RAM BUYERS?

AHDB's investment in genetic improvement is worth over £14.7m per annum to the sheep industry.

Farm trials show typical benefits derived from using high index sires of £3–£5 per lamb – often more. For commercial farmers, the message is simple: it pays to invest in a performance-recorded ram.

FEATURES OF THE NATIONAL TERMINAL SIRE EVALUATION

Signet's genetic evaluation uses a statistical approach to estimate an animal's genetic merit based on pedigree and performance data. The analysis accounts for genetic and non-genetic influences on performance to generate Estimated Breeding Values (EBVs) for traits of economic importance.

A multi-breed approach means:

❯ Estimated Breeding Values (EBVs) are more commercially focused and easier to interpret

❯ Breeding values are updated each month

❯ Crossbred and commercial animals are included in evaluations, enabling the generation of breeding values for carcase traits

❯ New research can be easily delivered to industry

WHICH BREEDS ARE INVOLVED?

The analysis includes data from the Beltex, Berrichon du Cher, Bleu du Maine, Blue Texel, Charollais, Dorset, Dorset Down, Dutch Spotted, Hampshire Down, Ile de France, Meatlinc, Oxford Down, Rouge de l'Ouest, Ryeland, Shropshire, Southdown, Suffolk, Texel (Non-pedigree) and Vendeen breeds.

WHERE CAN I FIND INFORMATION?

The latest breeding values are only three clicks away. Head to **signetdata.com**, select 'Sheep Search' and enter the flockbook number or UK ministry tag of the animal of interest.

The website displays over 20 different breeding values and a series of breeding indexes to help identify the top-performance individuals.
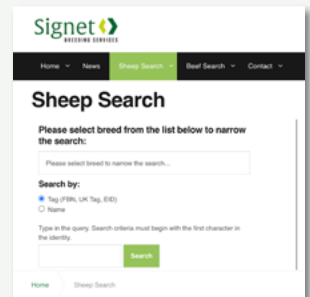
HOW ARE BREEDING VALUES EXPRESSED?

Breeding values are expressed on a breed-specific basis, meaning an animal's EBVs are reported relative to the average performance of the breed in 2010. EBVs should be interpreted relative to the breed benchmark, which reports the values for the average, top 25% and top 10% of the breed.

GETTING STARTED – SUPPLYING DATA TO SIGNET

There are two main ways to record your flock with Signet:

❱ Online data entry into the Signet database at **signetdata.com**

❱ Submitting electronic files generated from farm software

Signet does supply services to breeders wishing to provide paper records, but the costs are higher.

ONLINE DATA ENTRY

For small flocks, the easiest way to record is to enter your data directly into the database.

Breeders can enter:

❱ Full lambing records – including fostering and ET recipient details

❱ Weight records for lambs and ewes

❱ Census data

❱ Animal names

Signet's user-friendly screens make data entry simple. For clients requiring assistance, a series of step-by-step video tutorials are available.

USING FARM SOFTWARE

Many farm software companies, such as Border Software and Shearwell, have output files specifically designed for Signet clients. Files can easily be created and sent to Signet via email.

When providing electronic data:

❱ Check that the order and format of the columns is that required for uploading data into the Signet database. If you are in doubt, contact Signet for a file specification

❱ Check your data before sending it. Ensure files contain the right number of sheep records and do a sense check, looking at the highest and lowest values in each column

BREEDING VALUES THAT MAKE LAMBING TIME EASIER

Ease of lambing is important as it has a high economic significance a major impact on lamb survival and ultimately farm profitability.

Two breeding values are produced that aim to reduce problems at lambing time:

❭ Birth Weight EBV – indicating sires whose lambs are smaller at birth

❭ Lambing Ease EBV – indicating sires capable of producing a greater proportion of unassisted births

To get the most accurate breeding values, recorded flocks should:

❭ Weigh lambs immediately after birth and report weights to the nearest 0.1 kg

❭ Submit a lambing ease score (1–5, where 1 = unassisted lambing and 5 = caesarean section) for each lamb

Selecting rams with positive breeding values for ease of lambing and slightly smaller birth weights will result in an increase in unassisted lambing events.

Where a breed society shares additional pedigree records with Signet for non-recorded animals, additional birth weight and lambing ease scores will contribute towards the analysis.

It is important to record data accurately. Where there is little variation in the records supplied, it will be included from the evaluation.

LAMB SURVIVAL

Research is currently ongoing to look at genetic influences on lamb survival; this work looks at the number of lambs born and the proportion that are weighed (survived) in the flock. To get the best out of this work, breeders should inform Signet about all of the lambs born (alive and dead) and ensure every lamb in the flock is weighed at eight weeks of age.

BREEDING VALUES THAT REDUCE DAYS TO SLAUGHTER

One of the simplest traits to measure in any pedigree flock is liveweight.

Breeders are asked to weigh lambs at around eight weeks of age and again at scanning time, typically between 16–21 weeks of age.

Three breeding values are produced from these two weights:

❱ Eight-week Weight EBV – an indicator of genetic potential for growth to eight weeks

❱ Maternal Ability EBV – the genetic influence a ewe has over a lamb's performance due to her milk production and maternal care

❱ Scan Weight EBV – an indicator of genetic potential for growth to scanning time (16–21 weeks)

Breeders interested in assessing and monitoring ewe mature size can submit weights at mating for both shearling ewes (to generate the Shearling Weight EBV) and older ewes.

USING ULTRASOUND TO ENHANCE CARCASE TRAITS

The UK sheep industry pioneered the use of ultrasound scanning technology to assess muscle and fat levels across the loin, with trained technicians measuring thousands of lambs each year at around 16–21 weeks of age (earlier in some faster-maturing breeds).

Two breeding values are produced from ultrasound data:

❱ Muscle Depth – an indicator of muscle depth across the loin
❱ Fat Depth – an indicator of fat cover (or finish) across the loin

Both breeding values provide a good indication of the overall muscle and fat yield within the carcase.

Ultrasound measures of muscle and fat depth are analysed relative to the animal's liveweight at scanning, providing an assessment of carcase attributes that are independent of growth rate. Breeding values predict the muscling and levels of finish expected from a ram's offspring at a fixed slaughter weight, which is advantageous for commercial farmers as lambs tend to be drawn on the basis of their weight (and finish), not their age.

On a weight-adjusted basis, there tends to be a negative relationship between the amount of muscle and fat in the carcase. When selecting sheep to increase muscling at a fixed liveweight, lambs can become leaner and hence a positive weighting is used in breeding indexes (see page 12) to optimise levels of finish.
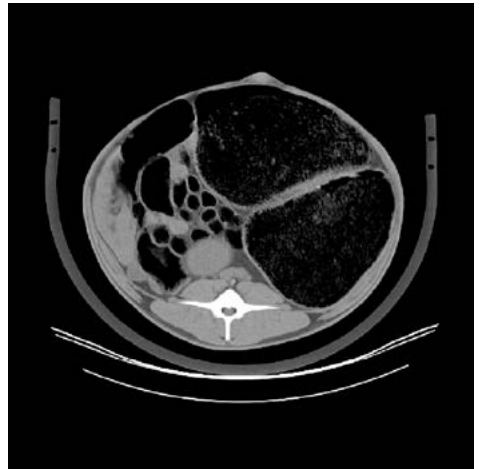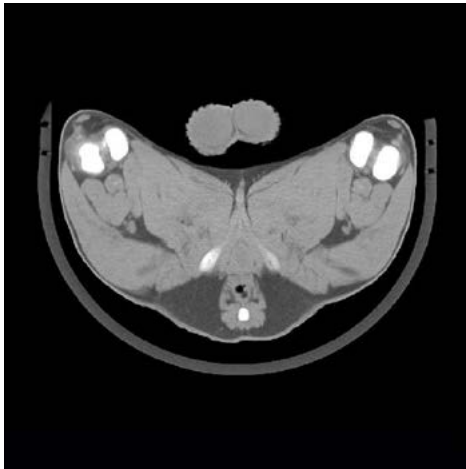
USING CT TO ENHANCE CARCASE TRAITS

Over the last 20 years, more than 13,500 lambs have been CT scanned and, using AHDB-funded research, a range of breeding values are now produced.

❯ Lean Weight EBV – an indicator of muscle yield

❯ Fat Weight EBV – an indicator of fat yield

❯ Muscularity EBV – an indicator of gigot shape and thus carcase conformation

❯ Spine Length EBV – an indicator of spinal length

❯ Vertebra Number EBV – an indicator of vertebrae number

❯ CT-predicted Intramuscular Fat (IMF) EBV – influencing aspects of meat-eating quality

These traits are assessed on a weight-adjusted basis. Selecting sheep with a high Lean Weight EBV will increase carcase yields and killing-out percentage.

Care should be taken in selecting for spine length, as longer lambs may have longer loins but narrower carcases.

To CT scan your sheep at Edinburgh or at one of the mobile CT sites located across the country, call Kirsty McLean on **0131 535 3251** or email **CTUnit@sruc.ac.uk**.

USING ABATTOIR RECORDS TO ENHANCE CARCASE TRAITS

Carcase weights and classifications are routinely analysed as part of the National Terminal Sire Evaluation to produce a series of EBVs for economically important abattoir traits.

❯ Days To Slaughter EBV – an indication of finishing speed

❯ Carcase Weight EBV

❯ Carcase Conformation EBV

❯ Fat Class EBV – where lower values indicate leaner carcases

Underpinning the publication of these breeding values is RamCompare, the UK's first commercial progeny test. RamCompare provides rams to commercial farms and abattoir records for these lambs contribute towards the analysis.

Breeders should give serious consideration to getting involved in RamCompare as an effective way to enhance their flock analysis and increase the profile of their breeding stock.

Many pedigree flocks support the analysis of these traits by supplying Signet with abattoir records for their deadweight sales to further enhance these predictions.

BREEDING MORE PRODUCTIVE EWES

Growth and carcase traits are usually the main focus for flocks breeding terminal sires, but for breeders retaining female replacements or selling rams to breed female replacements, a number of important maternal traits are also available to aid selection.

❯ Maternal Ability EBV – showing the genetic influence ewes have on lamb growth due to their genes for milk and maternal care

❯ Litter Size Born EBV – indicating females that produce more lambs

❯ Litter Size Reared EBV – indicating females that rear more lambs

Some flocks may consider limiting increases in ewe mature size that inevitably arise when selecting for faster-growing lambs. If the overall efficiency of the ewe flock is important and ewe weights are larger than desired, consider using breeding values to select for smaller ewe mature size.

❯ Mature Ewe Weight EBV – indicating ewe mature size

BREEDING INDEXES

A breeding index pulls together information on individual breeding values, enabling rams to be ranked for a specific breeding objective.

The National Terminal Sire Evaluation publishes a series of commercially focused breeding indexes.

TERMINAL SIRE INDEX

To select rams with fast-growing, well-fleshed progeny

This index balances the requirement to produce fast-growing lambs against the need for a high yield of meat in their carcase and an optimum level of finish. A positive weighting is placed on fatness to avoid the selection of ultra-lean genetics.

MATERNAL INDEX

To select rams to breed productive daughters

This index favours genetics producing fast-growing, well-fleshed lambs, but it also rewards those rams whose daughters will successfully rear more lambs due to their genes for prolificacy, milk and maternal care.

This index doesn't penalise changes in ewe mature size. Some breeders will wish to place additional emphasis on this trait to avoid increasing ewe mature weights.

LAMB VALUE

Identifying the most profitable sires for carcase traits

With the release of breeding values for carcase traits, a new index was launched – Lamb Value. This index places an economic value on the breeding values for carcase weight, conformation, fat class and days to slaughter to highlight the most valuable sires based on their carcase attributes.
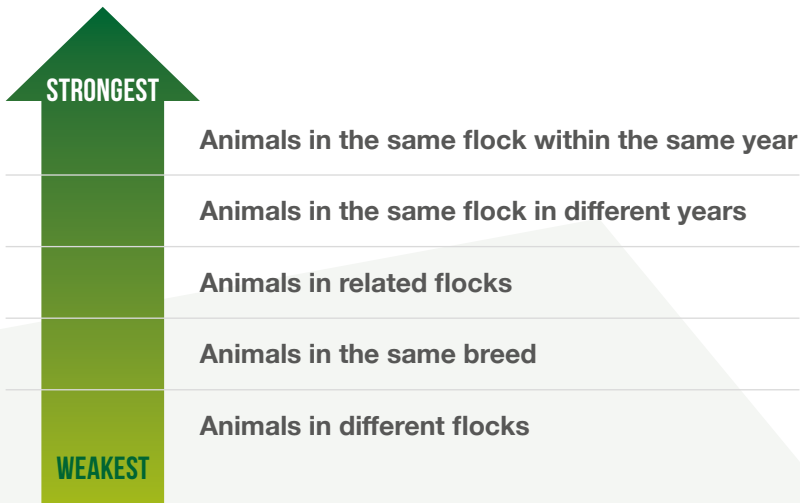
Customisation of Indexes

Signet provides online access to Index Customisation software that enables breeders to create and compare simple indexes for use within their flock.

COMPARING PERFORMANCE

The principles established in 1990 when comparing EBVs for sheep reared in different flocks are as true today as ever.

To enable comparisons between flocks, there needs to be genetic linkage between, i.e. common genetics in both flocks through the use of a shared ram or sires that are related. It will never be possible to compare every sheep across the board and, for that reason, results are currently published on a breed-by-breed basis.

STRENGTH OF COMPARISON

STRONGEST

Animals in the same flock within the same year

Animals in the same flock in different years

Animals in related flocks

Animals in the same breed

Animals in different flocks

WEAKEST

While it is challenging to create genetic linkage between flocks, breeders can work together to enhance the robustness of comparisons.

Advice to breeders:

❯ Work together to share rams of known genetic merit, including the identification of reference rams for wider use

❯ Consider involvement in RamCompare or using breeding lines widely tested in RamCompare

❯ Where flocks are run together on the same holding, ensure Signet links these flocks within the analysis to create a single contemporary group

❯ Genomic evaluations may provide breeders with new solutions when it comes to comparing their sheep, so consider getting animals genotyped

A GENOMIC FUTURE

For 50 years, our approach to breeding improvement has taken a familiar path: measure the animal, account for non-genetic influences on performance and then compare it to other animals in the flock and wider population.

In a genomic age, we move from making predictions about an animal's genetic potential to using DNA to determine their actual genetic make-up.

Genomic data informs us about:

❯ Parentage – correcting potential errors in pedigrees

❯ Breed composition

❯ Levels of inbreeding – both historic and recent

❯ Major genes of interest – both beneficial and deleterious

❯ Minor genes that explain small differences between individuals but which can be combined to enhance current breeding values

A genomic approach increases the accuracy of genetic predictions and rates of gain. It will:

❯ Make it easier to assess hard-to-measure/expensive traits

❯ Increase the accuracy of breeding values, particularly those expressed late in life (longevity) or by a single sex (milk, prolificacy)

❯ Enable decisions to be made earlier in an animal's life

❯ Enhance comparisons between flocks, allowing less well-recorded breeding lines to be incorporated into a breeding programme

❯ Allow mob mating – though there are advantages and disadvantages to this approach

Advice to breeders:

❯ Genotype your sheep (particularly rams) using a service that delivers a full genotype, as opposed to individual tests (like Scrapie) or parentage

❯ Never discard semen from ungenotyped rams, always hang on to a straw or two for the purposes of genotyping

❯ Consider approaches to storing tissue from ungenotyped animals that may be of value in the future

❯ If you are planning to genotype, do it early to provide time for information to be returned for sales/evaluations

❯ Share the data with Signet's genetic evaluation service

SOURCES OF GENETIC INFORMATION

All of Signet's genetic information is hosted online, giving breeders and prospective ram buyers open access to the latest genetic information.

The website displays information about individual animals and allows users to search for elite breeding lines in performance-recorded flocks.

FlockFinder is a service that shows commercial ram buyers how to find their nearest recorded flocks.

Breeding charts show where an animal ranks in the breed for a particular trait. These can be easily downloaded from the website for marketing purposes.

As part of the Signet service, breeders can generate:

❯ Flock reports to assist selection decisions, including reports showing genetic trends over time

❯ Breed reports showing the leading stock rams and ram lambs, helping breeders to source new breeding stock

❯ Family trees to display pedigree information

❯ Catalogues/sale charts to increase ram sales

❯ Inbreeding software to create breeding plans

Getting started

Send Signet an email at **signet@ahdb.org.uk** and an electronic contract will be returned so we can set up your account.

In many cases, Signet will already have information about your breeding stock or be able to upload it simply from your farm records prior to the start of lambing.

The Signet website lists contact details for ultrasound scanning providers, so you can arrange for a technician to measure your lambs.

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