Buying a recorded ram

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Introduction

Signet Breeding Services is part of the Agriculture and Horticulture Development Board (AHDB) and provides performance-recording services to sheep breeders right across the country.

Performance data collected by pedigree and commercial producers is analysed by the Signet Sheepbreeder Service. This independent analysis calculates how much of each animal's performance is due to its breeding merit.

Estimated Breeding Values (EBVs) provide ram buyers with an accurate and unbiased prediction of a ram's genetic merit. EBVs have been used in the UK sheep industry for more than 30 years; massive advances in flock identification, record keeping, ultrasound scanning, handling systems, computing power and, more recently, genomics have transformed our ability to use this basic information to identify and breed from sheep with superior genetics.

The value of genetic improvement to the UK sheep industry exceeds £14.7 million per annum (AbacusBio, 2022), and at the farm gate, lambs sired by high-index sires can easily exceed an additional £5 per lamb.

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BREEDING SERVICES

What are Estimated Breeding Values (EBVs)?

Looks can be deceptive

Despite the importance often placed on the look of a ram, the only influence it has upon the performance of its progeny is through its genes. It is vitally important that commercial buyers assess the genetic merit of the sires they intend to buy.

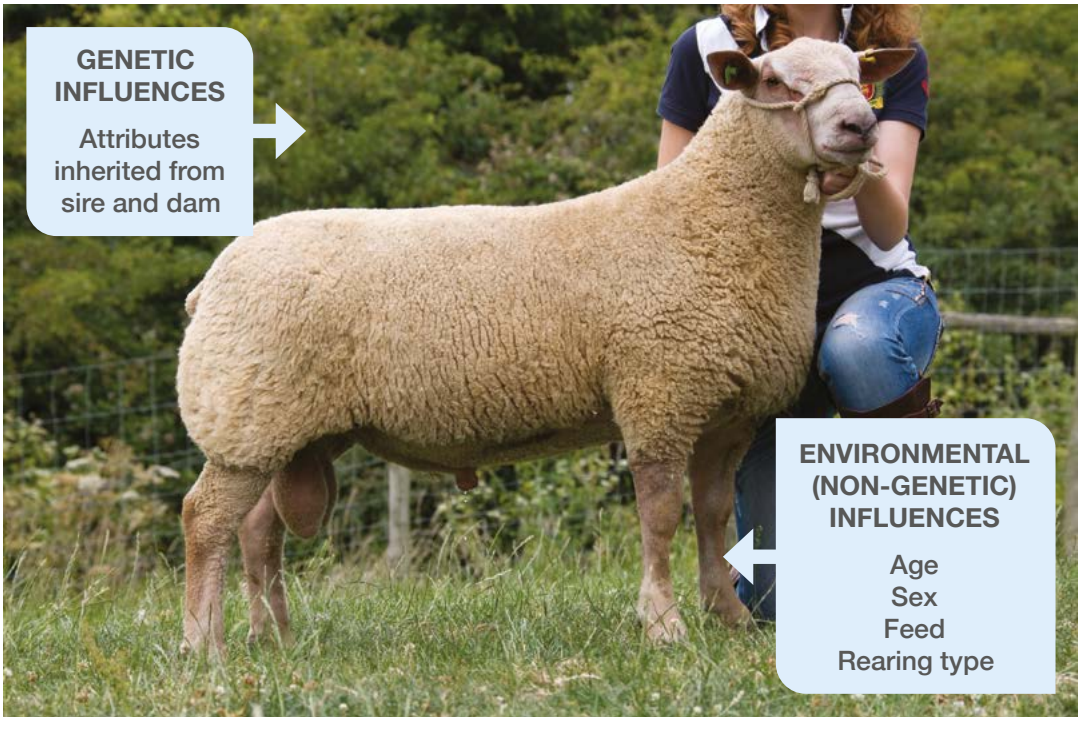
This is easier said than done, because so many factors influence an animal's appearance – including its age, whether it was reared as a single or twin and, most importantly, the amount it was fed.

Recording schemes were developed to make the process of identifying superior genetics easier. Records of performance are analysed to tease out the non-genetic influences on an animal's performance so that its true genetic potential can be assessed. This is important for traits that are visible, such as growth rate and carcase conformation, and vital when it comes to maternal traits that cannot be assessed visually.

Estimated Breeding Values (EBVs) estimate the genetic potential of an animal for a range of traits. EBVs are not just for pedigree breeders. Commercial producers are also seeing the benefits of looking deeper into an animal's background before purchase, using data to make informed purchasing decisions rather than buying on looks alone.

Tools like EBVs and indexes are freely available. Breeding values for over 30 different breeds of sheep are available at **signetdata.com**. The Signet website enables producers to find a recorded flock close to their farm and search the genetic merit of individual animals.

Using rams with superior breeding can increase flock performance and ultimately profitability; breeders can earn an extra £5 per lamb by using Signet-recorded rams.



Profit through performance

The financial impact of selecting for growth and carcase traits

For over 20 years farm trials have shown the financial benefit in using high-index-recorded rams. These real-life examples from RamCompare, a commercial progeny test, show that benefits worth an extra £4.50 to £7 per lamb were obtained from using a sire with superior genes for growth and carcase traits.

Over a ram's productive lifetime this can be worth an extra £600–1,000.

Hampshire Down – 'Normanby Profit'
Farm: H L Nelless, Northumberland (2023)
Progeny: 18.25 kg @ 125 days
Farm average: 17.93 kg @ 137 days

Suffolk – 'Midhope Hans Solo'
Farm: Mark Exelby, Yorkshire (2020)
Progeny: 19.22 kg @ 214 days
Farm average: 18.47 kg @ 228 days

Charollais – 'Redhill Weighsmore'
Farm: Adrian Coombe, Cornwall (2023)
Progeny: 18.34 kg @ 174 days
Farm average: 18.10 kg @ 187 days

Meatlinc – 'Richardson Value'
Farm: Adrian Coombe, Cornwall (2023)
Progeny: 18.60 kg @ 195 days
Farm average: 18.12 kg @ 209 days

Even greater benefits achievable when selecting maternal sires

The benefits derived from buying a superior maternal ram will take longer to be expressed, as they tend to arise when a ram's daughters give birth for the first time.

However, over a longer period the benefits will be greater, as selective breeding can increase the number of lambs reared for sale, and this improvement will continue to be delivered for many years across successive generations.

EBVs that influence growth and carcase

Why growth and carcase quality matters

Rams with superior genes for growth rate and carcase traits can:

- Enhance carcase weight and conformation
- Reduce days to slaughter and the proportion of lambs finished off grass
- Time sales to hit periods with better market returns
- Increase the size of store lambs

Financial returns in a maternal flock can be improved by enhancing the carcase characteristics of lambs that are not being kept as replacements, increasing the number of lambs meeting market specifications.

Eight-week Weight EBV (kg)

An indication of breeding potential for growth to eight weeks of age.

Example
A ram with an EBV of +4 kg is estimated to produce lambs which are 2 kg heavier at eight weeks of age than a ram with an EBV of 0.

Scan Weight EBV (kg)

An indication of breeding potential for growth at scanning time – typically 17–21 weeks of age.

Example
A ram with an EBV of +6 kg is estimated to produce lambs that are 3 kg heavier than a ram with an EBV of 0.

Muscle Depth EBV (mm)

An indication of breeding potential for muscling across the loin.

Example
A ram with an EBV of +4 mm is estimated to produce lambs with loin depths 2 mm deeper than a ram with an EBV of 0.

Fat Depth EBV (mm)

An indication of breeding potential for fatness across the loin.

Example
A ram with an EBV of –1 mm is estimated to produce lambs with 0.5 mm less fat across the loin than a ram with an EBV of 0.

Remember

- Growth rates are important in most production systems
- Breeding potential for high growth rates will only be realised under good management, including appropriate feeding and high flock health status
- In flocks where females are retained for breeding, selecting rams with high EBVs for growth rate can increase ewe mature size, reducing flock efficiency
- Select rams with the optimum fat depth EBV for the flock. Flocks producing too many overfat lambs should select sires with lower fat depth EBVs

EBVs from computed tomography (CT)

Many terminal sire breeders now make use of computed tomography (CT). This allows them to assess carcase characteristics of live lambs to a much finer degree than by ultrasound scanning.

CT is used to measure the total amount of muscle and fat in the body to a very high level of accuracy.

CT Lean Weight EBV (kg)	CT Fat Weight EBV (kg)	CT Gigot Muscularity EBV (mm)
An indication of breeding potential for weight of muscle in the carcase. **Example** A ram with an EBV of +2 kg is estimated to produce lambs with 1 kg more muscle in their carcase than a ram with an EBV of 0.	An indication of breeding potential for weight of fat in the carcase. **Example** A ram with an EBV of -1 kg is estimated to produce lambs with 0.5 kg less fat in their carcase than a ram with an EBV of 0.	An indication of breeding potential for width of gigot. **Example** A ram with an EBV of +4 mm is estimated to produce lambs with 2 mm wider gigots than a ram with an EBV of 0.

Other breeding values developed from CT images

CT images can be used to produce breeding values for a range of carcase traits, including:

- Total spine length (split into thoracic and lumbar regions)
- Total vertebra number (split into thoracic and lumbar regions)
- CT-predicted intramuscular fat percentage
- CT-predicted eye muscle area

The availability of these traits will allow breeders to improve meat eating quality and change the shape of the carcase.

EBVs from abattoir data

RamCompare is the UK's commercial progeny test for terminal sire rams. Launched in 2015, data has been collected from more than 44,000 commercial lambs sired by over four hundred and fifty rams. Lambs are measured from birth to slaughter, with the data analysed as part of our genetic evaluation service.

Ram breeders are now increasing the size of the dataset by including abattoir data from their own farms, and breeding values derived from abattoir data are now provided in both our terminal sire and maternal evaluations.

Days to Slaughter EBV (kg)

An indication of the speed with which lambs will reach slaughter weights.

Example
A ram with an EBV of –10 days is estimated to produce lambs that finish five days earlier than a ram with an EBV of 0.

Carcase Weight EBV (kg)

An indication of weight at slaughter.

Example
A ram with an EBV of +1 kg is estimated to produce lambs that are 0.5 kg heavier than a ram with an EBV of 0.

Carcase Conformation EBV

An indication of breeding potential for muscling across the carcase.

Example
EBVs are calculated by converting the EUROP grid to a numeric scale. A ram with an EBV of +3 has the potential to produce progeny with carcase conformation scores half a grade higher than a ram with an EBV of 0.

Carcase Fat Class EBV

An indication of breeding potential for fatness across the carcase.

Example
EBVs are calculated by converting the EUROP grid to a numeric scale. A ram with an EBV of -3 has the potential to produce progeny with fat grades half a grade lower than a ram with an EBV of 0.

Lamb Value – A new breeding index

Lamb Value is a new breeding index that considers the economic value of these four traits, enabling rams to be ranked according to their financial worth. Lamb Value is expressed in financial terms and reported alongside abattoir traits. Breeding values are readily available from the Signet website **signetdata.com**

What have we learnt?

The RamCompare project has shown that data derived from commercial farms and abattoirs can be used to strengthen the national genetic evaluation. It highlighted the financial impact high genetic merit rams can have in commercial systems, highlighting differences worth an additional £5 per lamb.

Most importantly, the project demonstrates that the EBVs for growth and carcase traits collected on pedigree farms are an accurate predictor of economic performance in commercial environments.

More information on RamCompare can be found at **ramcompare.com**

RamCOMPARE

EBVs that influence maternal performance

A key economic driver influencing flock profitability is the number of lambs reared per ewe. This is a function of both the ewe's fertility and her ability to successfully rear lambs.

Rams pass maternal traits to their female offspring. These traits are important in closed flocks or where females are sold for breeding.

- Selecting rams with high litter size EBVs will increase the number of lambs produced by their female offspring
- Selecting for improved maternal ability EBVs will ensure ewes have sufficient milk to rear their lambs

Litter Size Born EBV (lambs)	Litter Size Reared EBV (lambs)	Maternal Ability EBV (kg)
An indication of breeding potential for female prolificacy. **Example** A ram with an EBV of +0.20 is estimated to produce ewes that produce 10% more lambs than a ram with an EBV of 0.	An indication of breeding potential for lambs successfully reared. **Example** A ram with an EBV of –10 days is estimated to produce lambs that finish five days earlier than a ram with an EBV of 0.	An indication of breeding potential for maternal care, particularly milkiness. **Example** A ram with an EBV of +1 kg is estimated to produce ewes whose lambs are 0.5 kg heavier at eight weeks than a ram with an EBV of 0.

New maternal traits

In recent years, AHDB-funded research has supported the development of two new breeding values:

- **Longevity (years)** – An indicator of sheep whose daughters will have superior productive lifespans
- **Lamb Survival** – An indication of breeding potential for lamb survival to an early age weighing event (e.g. eight-week weight)

Remember

Using EBVs to enhance prolificacy is much more reliable than simply selecting rams born as twins.

Lamb survival is influenced by genetic and non-genetic factors. Flock management should be reviewed if large increases in prolificacy are planned.

The benefit of selecting rams with superior maternal genetics will be expressed for many seasons, with improvements passed to subsequent generations of female replacements.

EBVs that influence ewe efficiency

There is a relationship between lamb growth rate and ewe mature size, with larger ewes tending to produce faster-growing progeny.

There is usually a benefit from increasing growth rates because lambs will be ready to market earlier. However, breeders must consider how this may affect the mature size of their dams.

Larger ewes may look good and have increased cull value, but, as well as improved lamb growth rates, larger ewes:

- Have increased nutritional requirements
- Reduced stocking density
- May perform poorly in a harsh environment
- Are more difficult to handle

Ewe Mature Size EBV (kg)	Body Condition Score EBV
An indication of breeding potential for liveweight at maturity. **Example** A ram with an EBV of +8 is estimated to produce ewes which are 4 kg heavier at maturity than a ram with an EBV of 0.	An indication of breeding potential for maintaining condition. **Example** A ram with an EBV of +0.8 is estimated to produce ewes with higher levels of body condition than a ram with an EBV of 0.

Remember

The optimum mature size for ewes in a flock will depend on the target lamb market and farm resources, particularly forage availability and housing.

The close relationship between lamb growth rate and ewe mature size makes it difficult to select for faster lamb growth rates and smaller ewe mature size at the same time. However, certain bloodlines are available that can do both – these are regarded as 'curve benders'.

Where breeding values for Ewe Mature Size are not available, as in our Terminal Sire Evaluation, the Shearling Weight EBV can be used instead.

In harsh environments it may be important to select ewes with positive breeding values for Body Condition Score to enhance fertility and ewe survival.

Use the EBV search tool on the Signet website to identify these rams. Visit signetdata.com/sheep-search/ebv-search

EBVs that influence health and welfare

Selecting for traits that have a beneficial impact on flock health and welfare will reduce vet and labour costs whilst having a positive impact on flock performance.

AHDB-funded research has led to the development of new EBVs for health and welfare traits. Further information can be found here **signetdata.com/technical/projects/ewebenefit**

Lambing Ease EBV (%)	Birth Weight EBV (kg)	Faecal Egg Count (FEC) EBV	IgA EBV
An indication of breeding potential for ease of lambing. **Example** A ram with an EBV of +6 would be expected to produce 3% more unassisted lambing events compared to a ram with an EBV of 0.	An indication of breeding potential for birth weight. **Example** A ram with an EBV of –1 kg would be expected to produce lambs 0.5 kg lighter at birth than a ram with an EBV of 0.	An indication of breeding potential for resistance for worms. **Example** Negative values are superior. A ram with an EBV of –2 will produce progeny that shed less worm eggs on to the pasture than a ram with an EBV of 0.	An indication of the breeding potential to amount an immune response to a worm challenge. **Example** Positive values are superior. A ram with an EBV of +0.05 will produce progeny that produce more IgA than one with an EBV of 0.

Remember

When breeding for health traits, pay attention to accuracy values which tend to be lower than for carcase and growth traits, as they are not measured in every flock. Ask the breeder whether their animals have been sampled for the trait of interest.

Most breeders use IgA EBVs in conjunction with FEC EBVs because this trait is still new to the industry. To breed for greater worm-resistance traits, use rams with negative FEC EBVs and positive IgA EBVs.

Breeding indexes

Signet delivers three mixed breed genetic evaluations to the industry:

- The National Terminal Sire Evaluation – for terminal sires
- The National Maternal Breeding Evaluation – for lowland maternal breeds
- The National Hill Sheep Breeding Evaluation – for hill and upload breeds

While EBVs identify animals that excel in individual traits, they can be combined into breeding indexes using economic weightings to meet a broader breeding objective.

Terminal Sire Index

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

Maternal Index

This index favours breeding lines that produce fast-growing lambs, but it also rewards sires whose daughters will successfully rear more lambs due to their genes for prolificacy, milk and maternal care.

Hill Index

This index is expressed in economic terms and is designed to enhance the overall productivity of the hill ewe. The index will increase lamb growth rates, maternal ability and the number of lambs reared in hill farming situations.

Subindexes

Parasite Plus

An indicator of sheep that are more resistant to parasites, considering breeding values for faecal egg count (FEC) and IgA.

Lamb Value

Highlights the economic value of a ram's progeny at slaughter based on their breeding values for carcase weight, conformation, fat class and days to slaughter.

Remember

The most accurate predictions are obtained from rams that are fully recorded. Always ask the breeder which traits they measure, how many lambs they measure and whether they are using recorded rams.

The more a breeder uses breeding values within their own flock, the more likely they are to breed superior rams.

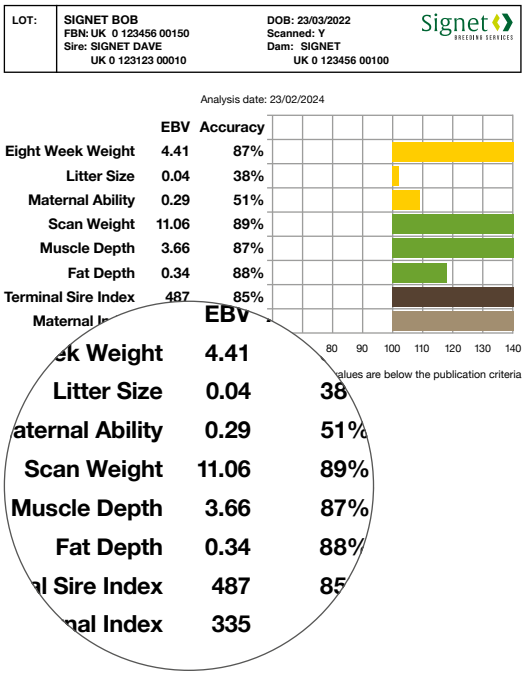
Interpreting EBVs

Signet produces breeding values from over five million sheep records. This information can be found at **signetdata.com** or obtained from ram breeders. Breeders will often highlight the genetic merit of their stock on sale charts and in catalogues.

Sale charts

Charts make it easy to evaluate the performance of a ram compared to the rest of the breed. The centre line indicates breed average, with bars to the right tending to indicate above-average performance (and more of that trait). Bars to the left infer below-average performance.

However, bigger isn't always best. Some ram buyers seeking hill rams will avoid rams with high Scan Weight EBVs if this increases ewe mature size. Breeding lines with extreme genetics for prolificacy or fatness bring their own challenges; therefore, the charts should be used as a guide so you can meet your flock-breeding objectives.



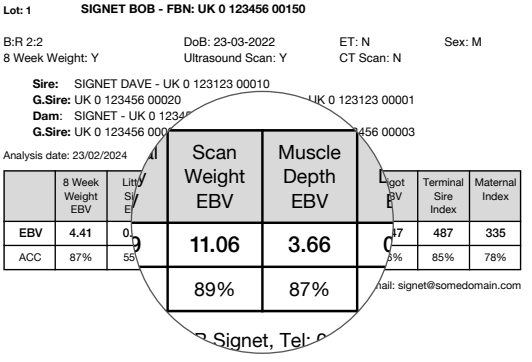
Example of a sale chart

Sale catalogue

The breeding values displayed in sale catalogues will also show an animal's pedigree and which traits have fed into the evaluation of that animal.

The best way to put a set of catalogue EBVs into context is to compare them to the breed benchmark.

The breed benchmark identifies the range that exists for a given trait, showing the breeding values for average, top 25% and top 10% animals. Benchmarks are updated annually.



Example of a sale catalogue

Accuracy values

Accuracy values indicate how much information has been used to calculate an animal's EBVs. They indicate the likelihood of a ram's EBVs changing over time and hence the risk associated with making a particular breeding decision.

Accuracy values are presented on a scale of 0–99%. The higher the value, the more is known about that ram. Maternal traits with a low heritability tend to have the lowest accuracy values. Flocks that genotype their animals will tend to have higher accuracy values.

Purchasing recorded stock with high accuracy values for traits of interest reduces the risk of poor performance.

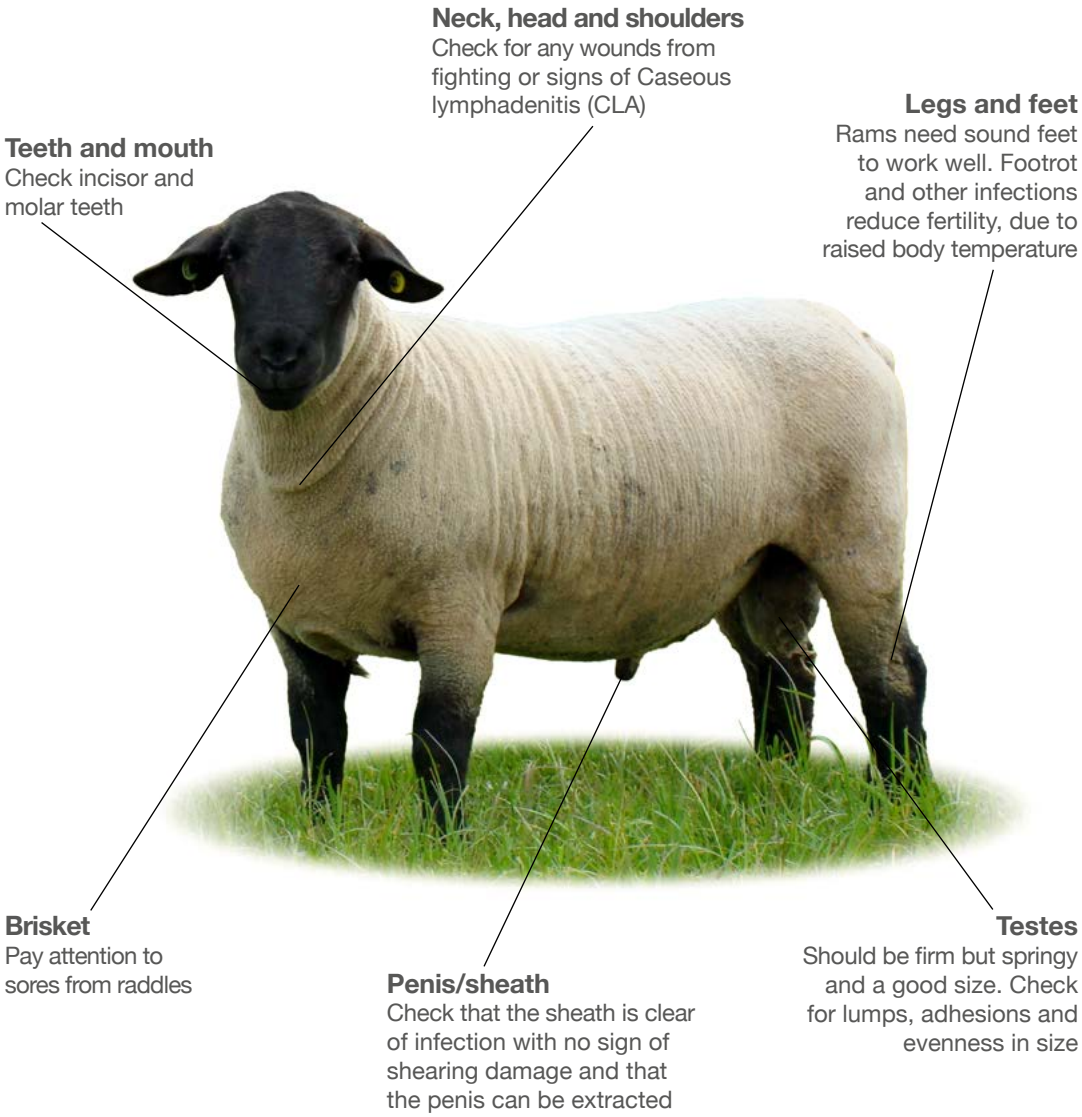
Fit-for-purpose rams

Take all factors into account when buying a ram – not just their EBVs. A ram can have the greatest genetic potential available, but if he is unable to work efficiently, those genetics and your investment will be wasted.

It is a good idea to assess rams to check they have no physical defects and are in a fit condition to work.

Purchase rams well in advance of the breeding season to ensure adequate quarantine time, and allow them to acclimatise to your system and changes in diet. Ensure you have a treatment and vaccination history from the vendor and administer any vaccinations needed.

Carry out a ram MOT at least 10 weeks before tupping to ensure he is fit and healthy for the season ahead, providing time to address any problems or source a replacement.



Finding a recorded ram

Rams can be purchased at an auction or directly from a breeder. There are advantages of both approaches.

Advantages of on-farm sales

- Lower biosecurity risk
- There may be more time to examine records and discuss specific needs
- The rest of the flock can be inspected
- Purchases can be made at any time
- The buyer gains a better understanding of the system that the ram has been reared in

Advantages of auctions

- Greater range of rams available
- Competitive bidding
- Sale cards and published information on display
- Opportunity to compare stock from different flocks

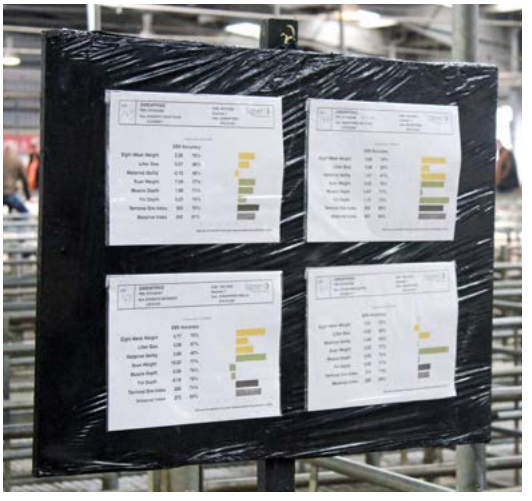
For any ram buyer, the Signet website (**signetdata.com**) should be their first port of call. Signet analyses over 80,000 lambs per year, identifying the leading breeding lines in 30 different breeds.

On the Signet website, buyers can:

- Locate their nearest breeder
- Check the genetic merit of current and future stock rams
- Search the database to find the highest genetic merit sheep for a given criteria
- Obtain a Breed Benchmark

All Signet-recorded flocks can access charts showing the genetic gain they have achieved in the flock over time. Ask to see this information when buying a ram, as it shows if the flock is actively improving the traits that are important to you.

Contact Signet if you need assistance in finding the information you require to buy the right ram for your farm.



Further information

Other publications from AHDB

- Sheep diseases directory
- Growing and finishing lambs
- Understanding lambs and carcases
- Flock notebook
- Performance-recorded terminal sires – Bred for commercial sheep production
- Selecting recorded rams for carcase traits

Web pages

- **signetdata.com**
- **ramcompare.com**

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