

Fit for Purpose Bulls

A blueprint for breeders

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Bull selection is one of the most important management decisions for both commercial producers and pedigree breeders, as a bull's genetics will guide the direction and performance of a herd for years to come.

Only a small number of pedigree breeding bulls are sold to pedigree herds and commercial beef producers are by far the biggest target market.

For a commercial buyer a bull is a significant financial investment, so a bull needs to remain fit and fertile for at least six breeding years, pass on the genetic traits he was purchased for and produce healthy, viable calves.

In 2013 EBLEX launched two bull buyers' surveys to learn more about what commercial bull buyers look for in a bull and the production systems of pedigree bull breeders.

Evidence from the bull buyers' survey suggests that more than 35% of breeding bulls bought in the past five years have been culled or died. Poor mobility was the main cause for culling. Recent studies carried out in the UK also suggest that 20-30% of bulls fertility tested are sub-fertile.

Over-feeding

Some concentrates are usually required to ensure breeding bulls are of an adequate weight and condition to work. However, there have been concerns for many years that breeding bulls are over-fed especially before the sales, which will limit their breeding performance.

This is a response to market signals from buyers who prefer the biggest and heaviest bulls. However, it is important to consider the short and long term consequences of over-feeding for overall animal health and performance.

Over-feeding can not only reduce a bull's working life significantly, it will also limit the number of calves he produces in each breeding season. This means more bulls are needed and more feed is used, which reduces the overall efficiency of a beef enterprise.

For these reasons, breeders and buyers should always ask questions about how bulls are reared before purchase.

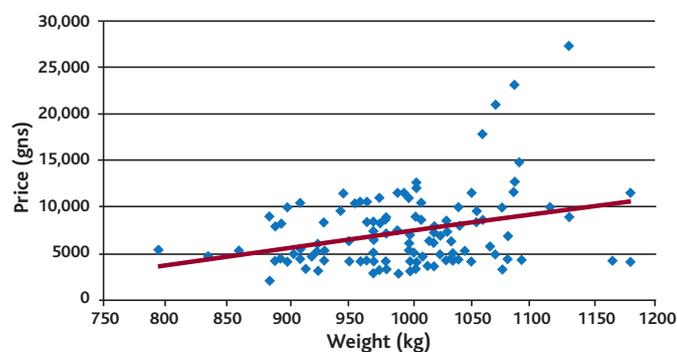


**Dylan Laws, EBLEX
Beef and Sheep Scientist**

Fight the wrong market signals

Although the results of the EBLEX survey shows that over half of bull buyers now use Estimated Breeding Values (EBVs) as part of their bull selection process, farmers at bull sales tend to focus on size or weight – the bigger or heavier the better. Breeders read these market signals and are encouraged to feed heavily to achieve bigger bulls at sale. And so the cycle continues.

Figure 1: Liveweight versus price paid for Charolais bulls between 18-21 months of age at Stirling in February 2013



The challenge for breeders is to be brave enough to change to a system that relies more on maximising forage, alongside careful and considered concentrate use, to produce bulls that are 'Fit for Purpose'. If this is done well, input costs can be reduced whilst revenue is maintained or even increased.

More and more commercial beef producers are now asking for 'Fit for Purpose' bulls.

This booklet provides a guide to feeding, managing and marketing this type of sire.

Implications of producing 'Fit for Purpose' bulls

- **Better grazing and forage management**

Investment in large-scale reseedling programmes is not necessary, but good grazing and forage management is essential

- **Significantly cheaper feed costs**

Well-managed grazed grass can cost as little as 6p per kg dry matter (DM) compared to 29p per kg DM for concentrates (at £250/t)

- **Different marketing**

Having 'Fit for Purpose' bulls is an excellent selling point as there are many benefits to discuss with potential customers. It is also worth talking through the effects such bulls can have on overall bull cost per calf, compared to an over-fed bull

- **Calves produced per bull**

How many calves a bull produces in his lifetime determines the return on his purchase cost. Table 1 shows the effect of the number of years working and number of cows mated, on the amount of calves produced in a bull's lifetime.

Table 1: Number of calves sired by bulls over a lifetime

Number of years used	No. of calves per bull per year				
	10	20	30	40	50
1	10	20	30	40	50
3	30	60	90	120	150
5	50	100	150	200	250
7	70	140	210	280	350
9	90	180	270	360	450

Table 2: Annual bull cost per calf produced (£)

Number of years used	No. of calves per bull per year				
	10	20	30	40	50
1	£330	£165	£110	£83	£66
3	£143	£72	£48	£36	£29
5	£106	£53	£35	£27	£21
7	£90	£45	£30	£23	£18
9	£81	£41	£27	£20	£16

An over-fed bull may last three seasons and produce ten calves per year, at a cost of £143 per calf born (Table 2).

The aim of a forage-fed bull should be to produce at least 30 calves per year and to last seven breeding years. This means the bull cost per calf would be around £30. Be aware that increasing the cow to bull ratio requires careful management and a fit and fertile bull.

- **Enhanced seller reputation**

Some breeders may think that producing longer-lasting bulls will reduce demand. However, as many experienced breeders know, reputation is vital when selling breeding stock. Word-of-mouth recommendation from satisfied customers will increase interest from other buyers and enhance the seller's reputation

Concentrate feeding

Why are concentrates fed?

- Concentrates have a high energy content per kg fresh weight, enabling greater energy intakes per day which results in increased growth rates
- They are easy to store and feed accurately
- The feeding value of grass is generally under-estimated. Under good management it can provide a source of high quality feed
- Early access to creep stimulates rumen development, helping to reduce any growth check at weaning by compensating for the falling milk yield of the dams
- Concentrates are good carriers for high-quality digestible undegradable protein (DUP) and minerals and vitamins. Zinc, selenium and vitamin E are particularly important, as they have been shown to improve sperm production and survival
- They can compensate for, or hide, poor milking ability in cows



Why is feeding high levels of concentrates so bad?

- Excessive feeding can disrupt normal body growth and development. For example, feeding high levels during periods of rapid growth in young bulls can reduce bone strength and density and lead to long-term joint issues
- Increased concentrations of starch and energy in the diet leads to excessive fat deposition causing over-fatness, hampering fertility and mobility. Excessive fat around the scrotum neck reduces sperm production
- It takes at least three weeks for the rumen to adapt to a significant diet change. Feeding large amounts of cereals before a sale means bulls moved onto a forage-based system straight after purchase often lose condition
- Cereal-based feeds are much more expensive

It is important to understand the production systems that potential customers may be using.

The effect of concentrate feeds on

Growth

Fast growth rates, stimulated by high levels of concentrate feeding result in:

- Smaller, less dense muscles containing higher levels of fat. This leads to early fatigue and reduced endurance when bulls work
- A weaker skeleton, less robust connective tissues and poor cartilage development, which increases the animal's susceptibility to injuries and reduces longevity

Rumen

Increased risk of acidosis and sudden death.

- Concentrates decrease the pH of the rumen at a faster rate than forage, making it more acidic. This slows the breakdown of plant fibre and leads to acidosis
- When the rumen pH falls too low, the lining of the rumen wall can be damaged, feed intake is reduced and growth rates fall. This means bacteria can enter the blood stream leading to liver abscesses and possible sudden death
- Finely ground, starch-rich cereal grains are most likely to cause acidosis if fed in large amounts.

How to avoid acidosis

- Feed cracked or rolled grains and do not exceed 40% of the DM of the total diet. Avoid finely ground cereals
- Consider including sources of digestible fibre such sugar beet pulp or soya hulls in the diet
- When housed, always provide a palatable source of long fibre, eg straw or hay. Intakes are likely to be 0.5-1.5kg per day depending on the size of the animal
- Allow enough trough space so all bulls can eat together at the same time. Always provide access to fresh, clean water
- Avoid sudden changes to the diet and build up gradually to full rations. Avoid feeding more than 2.5kg/head of cereals per feed
- If using a TMR, mix the ingredients so that they cannot be sorted out into the constituent feeds
- If using compound feeds, make sure they are formulated for bulls, preferably by including ingredients with a large particle size



A healthy rumen wall



A damaged rumen wall with lesions due to acidosis

Bone, joint and hoof development

Having healthy bones, joints and hooves is essential for bull performance during the breeding season and for longevity. This is due to the strain the hind limbs and hooves come under whilst serving cows.

It is estimated that more than 20-30% of bulls fail bull breeding soundness examinations due to muscle and bone problems.

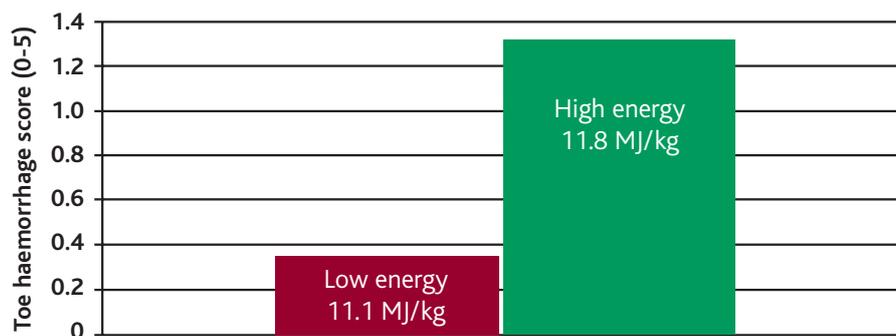
The EBLEX bull buyers' survey found that 36% of bulls bought in the past five years had died, been culled or sold. Of these, 25% had been removed due to mobility issues.

Prolonged periods of fast growth, promoted by heavy feeding of concentrates reduces bone density. In some diets these can lower the concentrations of calcium (Ca) and phosphorus (P) in the animal's bone.

High energy diets can also increase the chances of abnormal foot growth and bleeding/haemorrhages within the hoof, resulting in lameness and poor mobility.

In one trial, toe haemorrhages in weaned calves fed a high energy diet were over three times more severe than those fed a low energy diet (Figure 2). This suggests that intensively feeding bull calves straight after weaning can increase the risk of lameness later on.

Figure 2: The effect of dietary energy (ME) on toe haemorrhage scores of intensively fed weaned calves.



Source: Greenough et al. (1990)

A study carried out on 45 breeding bulls in Sweden investigated the links between poor performing bulls and arthritis.

- None of the bulls in the investigation were visually lame
- 65% of bulls culled for poor performance were found to have severe arthritis
- 83% of the bulls that underperformed but were found to have good fertility, had severe arthritis
- None of the bulls that showed good breeding performance had severe arthritis

Foot problems in bulls are too common and have a devastating effect on reproductive performance. Prolonged periods of lameness can lead to long-term leg and joint issues.

Treat animals rapidly for lameness, but consider culling if the problem persists or the same animal has been treated more than twice.

Encourage buyers to look closely at the bull's legs and foot structure before purchase.

The effect of concentrate feeds on...

Testicles and sperm production

The effects of continuous over-feeding on testicles and sperm production are summarised in Table 3.

Continuous over-feeding has been shown to increase scrotal size at 12 months of age. However this advantage is lost by the time bulls reach 15 months of age. It is unlikely the increase in scrotal size by 12 months of age has any benefit on bull fertility over the first breeding season or in the longer term.

Bulls fed high energy diets:

- Have more fat around the scrotal neck which reduces sperm production
- Have more trouble cooling their scrotum. High scrotal temperatures reduce sperm quality and testosterone levels which, in turn, decrease libido
- Produce new sperm more slowly. This means over a breeding season his fertility will reduce with every cow he serves, so less calves will be born early in the calving period

Table 3: Effects of over-feeding bulls on fertility

Testicular size	▲
Sperm motility	▲
Semen volume	▼
Sperm abnormalities	▲
Sperm reserves	▼

Kidney function

When bulls are intensively fed with high levels of concentrate, urinary calculi or urolithiasis can occur, particularly in diets poorly balanced for minerals.

Large stones of phosphorus (P) and magnesium (Mg) salts can develop and block the urethra. This restricts the passage of urine and can lead to rupture of the bladder and death.

Such calculi have not been found in grazing animals.



How to avoid urolithiasis

- Feed less concentrates (high availability of P) and feed high forage diets instead (lower availability of P)
- Include 1.5% salt in the diet to promote a higher water intake to dilute the urine. The total sodium (Na) content should be about 6g/kg DM fed
- Allow access to plenty of clean, fresh water
- Feed a high ratio of Ca:P as this reduces the absorption of P so less is available for urinary excretion. This ratio should be at least 2:1 but preferably nearer 3:1
- Feed diets low in P (less than 4.6g/kg DM) and Mg (less than 2.3g/kg DM)
- Adding ammonium chloride to the diet to reduce the pH of the urine, helps stop stones forming. This needs careful diet formulation from a nutritionist, as using too much can increase the risk of the bone development problems

Estimated Breeding Values (EBVs)

There are some common misconceptions amongst commercial bull buyers such as:

- The biggest bulls will produce the best calves
- Herds can obtain higher EBVs by feeding more concentrates

Providing that there is enough genetic linkage between recording herds, EBVs will take into account differences in herd management.

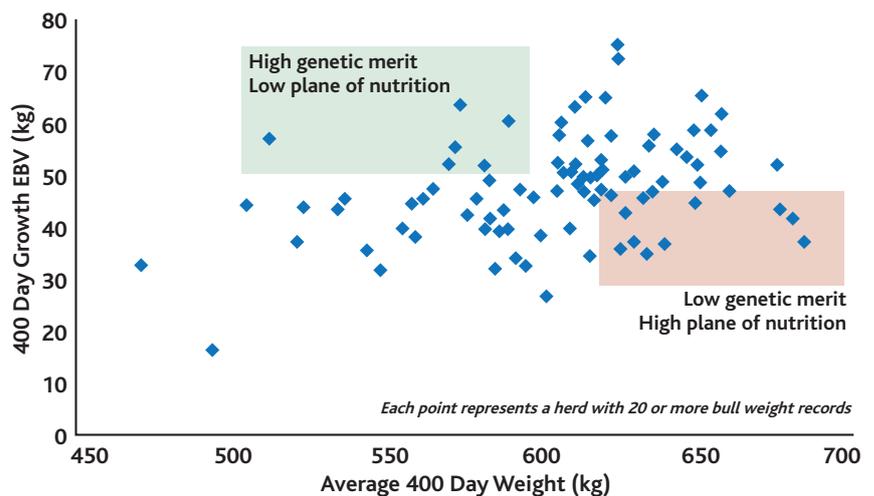
Breeders do not need to overfeed bulls to achieve high EBVs.

EBVs identify cattle with superior genes for growth, even when they are reared on high forage diets and are lighter than those reared in more intensively-fed herds.

Figure 3 shows how EBVs can differentiate between herds with poor genetics on a high plane of nutrition and herds with good genetics on a low plane of nutrition, by comparing herd average 400 Day weights with 400 Day Growth EBVs.

The bulls at the bottom right of the graph may look fantastic at a sale, but have relatively poor genes for growth and carcass traits.

Figure 3: Limousin data: Average 400 Day weights of bulls reared in different herds plotted against average 400 Day weight EBV (kg)



Source: Signet 2013

Breeding bulls 'Fit for Purpose'

Sam Boon, Signet Breeding Services

"Most pedigree breeders are producing bulls to sell to commercial producers. But how similar is their production system to their clients?"

Pedigree bull breeders have traditionally calved early in the year, with growth rates maximised through the use of high energy diets to increase their weight or size in the show and sale ring.

But what if genes express themselves differently in one environment when compared to another? A recording system is less valuable if it promotes cattle whose genetic potential is only expressed under show management and not under commercial conditions.

There is evidence to suggest that animals with the best performance under one environment will not necessarily be the best performers in another. This is known as the 'GxE interaction' which is a measure of the level of interaction seen between an animal's genetics (G) and its environment (E).

It is important that the performance of the commercial progeny produced by recorded sires meet the expectations of commercial producers. To ensure this, breeding bulls need to be produced in systems similar to those their calves will be reared in.

Bull producers involved in performance testing need to consider whether they wish to test their calves under a low or high input system."

Advantages of a low input system

- May be more cost effective
- Less chance of GxE interactions (within reason)

Disadvantages of a low input system

- Bulls may be smaller
- A need to focus on selling bulls 'off farm'

NB: Commercial management does not mean poor management.



Obtaining accurate EBVs in lower input systems

If a breeder wants to test their cattle on a lower input system, then the following suggestions are worth bearing in mind.



Tips	How	Why
Ensure high levels of genetic linkage to other recorded herds	Ensure some of the calf crop is by a sire* used in other recorded herds. This is most easily achieved using a widely used, high accuracy AI sire. Calves by this AI sire should be born at the same time as those by other bulls	To ensure the BLUP** analysis recognises that lower levels of calf performance are due to the management of the herd, not their genetic merit
Ensure high levels of linkage within the herd across seasons	Ensure stock bulls are used for more than one season. AI can represent more of a challenge – make sure some AI sires are used for more than one year	To ensure the analysis recognises that lower levels of calf performance are due to the management of the herd, not to a new team of sires
Try to manage all of the recorded calves in the same way	Aim for a tight calving period (six to eight weeks) and provide similar feed/forage/health treatments to all calves. Record everything (including steers) and not just the best ones. If calves are to be split (for management/castration etc) weigh*** the group before it is split	This will eliminate environmental bias
Consider scanning later	Book a later scanning appointment	Cattle need to be expressing differences in muscling and fat depth – if youngstock are grown more slowly this will take longer to achieve
Pay attention to forage availability	Forage budgeting	If forage availability is greatly restricted results can be compromised, as calves are affected in different ways. Later born calves may be artificially favoured
Pay closer attention to health care	Health planning and monitoring	Results will be compromised as some cattle will be exposed to a greater challenge than others

* Breeders recording with ABRI should remember that Breedplan requires at least two sires to be represented in a contemporary group, if the performance of the progeny is going to contribute to the calculation of EBVs for their sire.

** BLUP = Best Linear Unbiased Predictions – produced by Signet and Breedplan.

*** Breeders recording with ABRI should remember to weigh all animals on the same day, as Breedplan contemporary groups are split according to weigh date.

Making use of younger bulls

Buying a younger bull gives him time to acclimatise to the farm and can prevent the purchase of an animal that has been over-fed. Producers can also select from the best genetics on offer and younger bulls may be cheaper to buy. However, they are only more cost-effective if they have a long working life – so they must be looked after.

At what age do bulls start working?

Data extracted from the records of 689 Stabiliser bulls with Signet recorded progeny, showed on average they produced their first calf at just over two years of age. This means they started working at around 15 months of age. In this dataset the majority of bulls were either used at home or sold off-farm – so they started to work as soon as they reached maturity.

In breeds where bulls are sold by auction, the average age at which a bull starts to work increases, as they tend to be sold when older. Bulls sold at auction are typically around 18 months of age at point of sale – but some are considerably older

How long is the average working life of a bull?

A dataset of 18,658 beef breed bulls born between January 2000 and December 2003 that had progeny assigned to them from the British Cattle Movement Service (BCMS) database, was used to estimate the working life of a bull over that time.

The assessment of this dataset does not account for missing death records, bulls over ten years of age that have not reached the end of their natural life, or health issues such as TB and Foot and Mouth Disease – which have foreshortened the life of many otherwise healthy bulls.

Despite these challenges some robust baseline figures relating to lifespan can be extracted.

- Approximately 80% went to a slaughterhouse
- Approximately 20% died on farm
- The average lifespan of those bulls with a date of death was 6.29 years, with relatively small differences between the most numerically important breeds
- This means a typical bull had a working life of just over four seasons
- 23% of bulls worked for two seasons or less
- 34% of bulls worked for three seasons or less

Figure 5 shows there is considerable variation in the average age at which bulls end their working life. This means that the bull replacement costs incurred on-farm also varies widely.

Figure 4: Age of Stabiliser bulls when their first calf is born

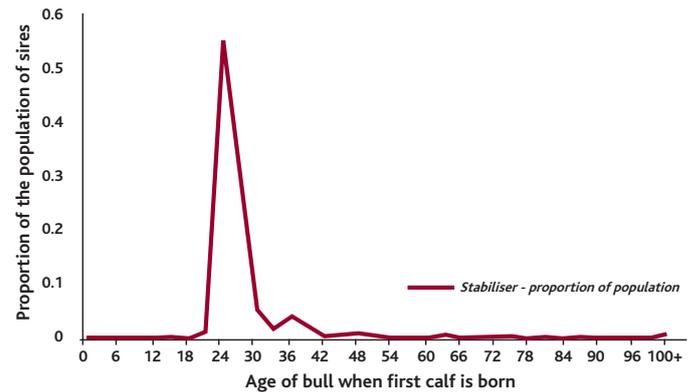
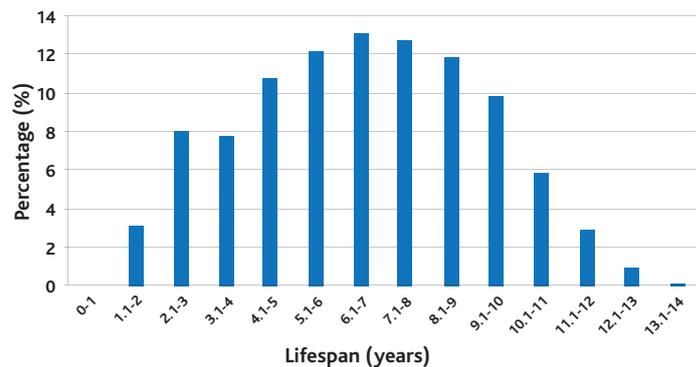


Figure 5: Distribution in the lifespan of purebred breeding bulls according to BCMS data from 2000 to 2003



Alternatives to concentrates

Grass and other forages can reduce the amount of concentrates needed within a bull production system and thereby decrease input costs. This does not necessarily have to result in lower growth rates.

Grazing grass

Achieving good growth rates on grass requires measuring and monitoring – of both the pasture and the animals.

If managed correctly, spring grass can have a metabolisable energy (ME) value of around 12MJ per kg and a crude protein (CP) content of over 20% in the DM, which is equal to, or better than many concentrate rations.

Table 4: Target sward heights for beef cattle

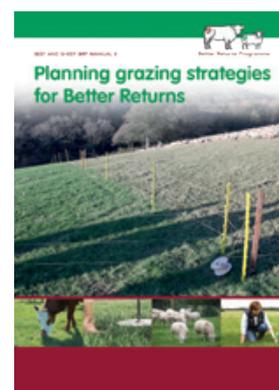
Class of stock	Grazing period	Rotational grazing		Continuous stocking (cm)
		Pre-graze (cm)	Post-graze (cm)	
Cows and calves	Turn-out - May	10-14	5-6	5-6
	June - July	12-15	7-8	7-9
	Aug - Nov	12-15	8-9	7-9
Growing cattle	Turn-out - May	10-12	5-6	5-6
	June - July	10-14	6-7	6-7
	Aug - Nov	10-15	7-8	7-8



The most efficient production systems are those that match the supply of grass with the demand for feed. Maximising the use of grass in breeding bull production is challenging, as feed demand does not reduce over autumn and winter when bulls are kept on until they are sold.

Tips for helping forage supply match feed demand:

- Grow clover-rich pastures or forage crops to spread the risk of dry summers when grass growth may slow down
- Measure feed supply and demand throughout the year to determine how much grass should be shut-up for silage that can be fed back over winter
- Use target sward heights to plan animal movements at pasture to maintain feed quality (Table 4)



Grass silage

Silage is often regarded as just a base for the winter ration. However, good quality silage can reduce the need for expensive concentrate feeds significantly (Table 5).

Finding out the nutritional quality of silage by taking a sample and sending it to a laboratory for analysis costs as little as £10, but can save significantly more than this in feed costs.

Feeding 33kg fresh weight of good quality silage per day can supply sufficient energy to sustain growth rates of over 0.8kg per day for a 400kg bull.

Table 5: Variation in silage quality

	Good	Poor
D-value	70	60
Energy ME (MJ/kg DM)	11.5	9.5
Crude protein (%) in DM	16	10
Dry matter (%)	28-30	20



Forage crops and brassicas

Grazing stock on brassicas can add flexibility to feed supply, but can also bring issues with iodine deficiency and bloat. Talk to the vet about any potential health risks and how to incorporate prevention techniques into the health plan.

Summer forage crops drilled to feed growing bulls are very useful. Brassicas, such as rape/kale hybrids, can be sown into a grass field after first cut silage for grazing 90 days later. They can also be useful as part of a reseeding strategy.

Maize silage

Maize can produce a high yield of relatively high DM silage and can be a good source of energy in a ration. It has low protein content in comparison to grass silage so protein supplementation is needed. Maize needs to be grown on suitable sites to prevent soil erosion and requires careful management.

Considerable interest has recently been shown in harvesting grain maize. Although relatively new, this produces a very high-energy concentrate-type feed.

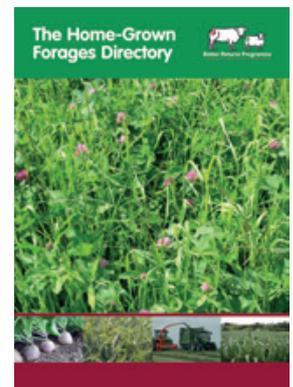
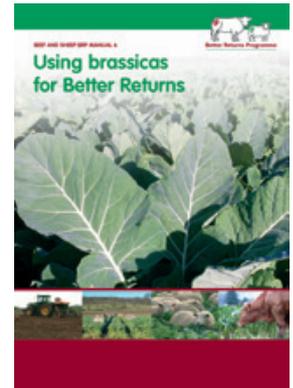
Lucerne

Lucerne or alfalfa is a legume that is valued throughout the world due to its yield, high protein level and drought tolerance and it is currently generating interest in the UK. Its nutritive value is around 18-22% CP and 10MJ/kg DM of ME.

It can be fed in combination with maize silage to make an ideal mixed forage ration, supplying a balance of energy and protein.

Trace elements

- Forage may be deficient in cobalt, copper, selenium, zinc and iodine. Bulls can have high requirement for zinc, cobalt and selenium
- A vet can check levels with blood tests from live animals or from samples taken from slaughtered stock and suggest appropriate treatment
- Measure the response to any treatment given to gauge if it is cost effective, eg higher growth rates or improved carcase weights
- Deep rooting plants like red clover and chicory, can have two to four times the level of trace elements found in grass
- Red clover can contain high levels of copper if grown on high copper soils. This can lead to toxicity if grazed for long periods of time. Liver samples from slaughtered animals can be used to check levels



Trace Element Supplementation of Beef Cattle and Sheep

By David Peers and Kate Phillips, ADAS Livestock Specialists, with veterinary comment from Hazel Fuller MRCVS

Key messages

- Copper, cobalt, selenium and iodine are essential trace elements required by cattle and sheep in England and Wales.
- Deficiencies of trace elements can cause poor production. However, there are other common causes of low productivity such as parasite infestations or energy deficiency.
- Trace element requirements vary with age and production level - young, pregnant and lactating animals have greatest need.
- A trace element deficiency should be confirmed by independent testing and advice before buying and feeding supplements.
- Grass and forage varies widely in trace element content due to soil type, pH, drainage, plant species and fertilizer etc.
- Clay soils generally have higher trace element levels than sandy soils.
- Soil testing may reveal gross deficiencies but should only be used as a guide when considering the trace element status of livestock.
- Herbage analysis can be misleading and needs careful interpretation.
- Deficiencies are more accurately diagnosed from blood or tissue tests.
- Diagnosis of a deficiency should be confirmed by monitoring the response to supplementation.
- Over-supplementation could cause toxicity or cause other undesirable interactions in the animal.
- Over-supplementation could waste money.

Keywords: trace element deficiency, trace element supplementation, copper, cobalt, selenium, iodine, forage analysis, blood trace element tests, tissue trace element tests.

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Feeding young calves

In the first few months of life, milk is the primary source of nutrition for calves, so the priority is to ensure their mothers are producing enough milk.

Providing a high feed value grass or silage is crucial at this stage. The key to optimising grass quality within a sward is to graze grass as the right sward height to maximise leaf to stem ratio.

Suckler cows and calves are often set-stocked at pasture. However maintaining a high quality sward is difficult if the herd is managed this way.

Sward heights must be measured weekly during periods of high grass growth or high animal demand to ensure the stocking rate is appropriate. Putting a rotational grazing system in place can help prevent any decline in feed value as the season progresses.

The challenge with small breeding herds is that there may not be enough grazing pressure to maintain sward quality when grass is growing rapidly. If pastures cannot be reduced in size by using temporary fencing, bring in other stock, such as heifer replacements to increase the grazing pressure.

It can be more challenging to plan grazing for herds with a prolonged calving period, as the feed requirements of cows and calves will be different at any one time. Tight block calving will produce more evenly sized batches of youngstock and mean the breeding cows are at similar stages of production and feed demand.

Feeding up to and after weaning

By the time calves are four months old, only half of their nutrient requirements come from milk. This decreases to 25% by the time they reach 200 days of age. This is the period in a calf's life when it is most efficient at converting feed into bodyweight.

Weaning can be a stressful time, leading to a check in growth rates. Unless weaning occurs in spring when grass growth quantity and quality is at its best, this period often offers the most efficient opportunity to utilise concentrates in a bull's lifetime.

Building up to approximately 2kg/head of creep at least three weeks before weaning and continuing until four weeks after weaning, reduces the chances of a significant check in growth rates.



The EBLEX bull breeders' survey found that:

- More than 70% of breeders creep fed their bull calves
 - The average start date was three months
 - The average end date was ten months
 - Average intakes were about 3.1kg/head per day
- Age at weaning ranged from five to 11 months, averaging eight months of age



Feeding growing bulls

Most of the nutrient requirements for a growing bull post-weaning can be met by forage. However, this will depend on forage quality, bull weight and target growth rate.

The EBLEX bull breeders' survey revealed that from weaning to 18 months of age:

- Target growth rate ranged from approximately 0.7 to 2.0kg per day, with an average of 1.5kg per day
- Concentrate rations ranged from 1kg/head per day to *ad-lib*, and averaged at 8kg/head per day
- 25% of breeders kept bulls housed all the time from weaning to 18 months of age
- 19% of breeders housed bulls for less than half the time between weaning and 18 months of age

Grazing strategy

Rotational grazing can increase the quality of grass grazed by bulls. It allows access to the best grass by moving them quickly between paddocks. The bulls can then be followed round with a group of non-cycling cattle or sheep to graze the grass down to the target residual height (see Table 4). This means that the grass will be at its optimum height and quality by the time the bulls come round to eat it again.

Balancing concentrates and forage

It is unlikely that breeding bulls can be produced to an adequate weight and condition from weaning to sale, without using some supplementary feed.

The aim should always be to maximise the use of forage and optimise the feeding of concentrates, whilst meeting target growth rates.

A good target is not to exceed 40% concentrates in the total diet, as DM. Exceeding this percentage will often lead to substitution, where bulls will reduce forage intake to make way for concentrates. Avoid feeding more than 2.5kg per feed to prevent acidosis.

Peter and Jonathan Chapman

Hele Barton Aberdeen Angus, North Cornwall

"We produce bulls to a target growth rate of 1.2kg per day. The aim is to do this using grass and silage, supplementing with concentrates at specific times of the year. This means we are confident that the bulls that do well with us, will do well with our customers.

Being spring calving, weaning usually coincides with housing and we use creep feed to reduce the check in growth rates. Weaned bulls are turned out in the spring, as soon as the conditions and grass growth allows. No hard feed is fed at grass until mid to late July, when grass quality starts to decline.

At calving, only the most vigorous bull calves born in the first three weeks are selected to take on as potential breeding bulls. From then on those that do not meet our target growth rates are weeded out.

By not pushing animals to the extreme we feel we are producing animals that last and go on to work for many years. We sold 29 out of 30 bulls from the 2012 crop, with one being kept for use in our own herd."



How heavy do breeding bulls need to be?

Although market signals favour heavier bulls, even the lightest bulls at sales often meet the target weights required to be 'Fit for Purpose'.

The age at which bulls reach puberty and sexual maturity is strongly linked to liveweight. Although this can vary depending on breed, health and nutrition, it is usually achieved at between 40-45% of mature body weight.

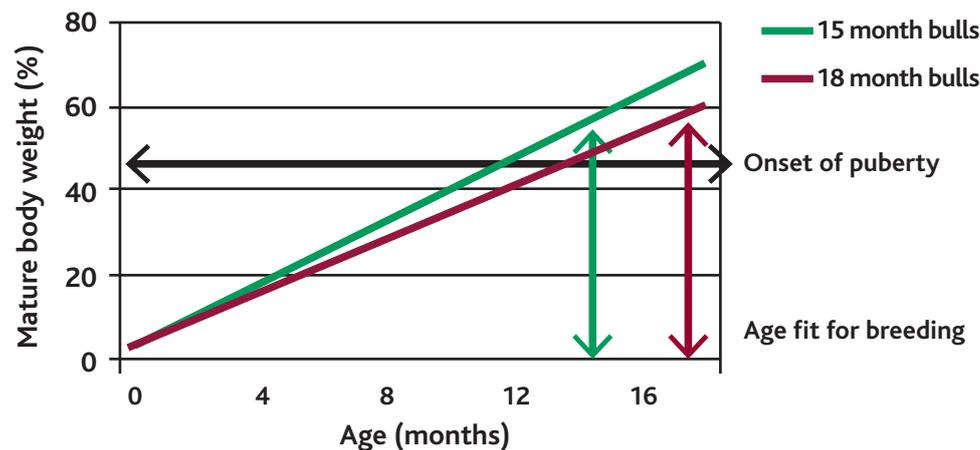
Once puberty has begun, there are several stages of sexual development lasting approximately 15 weeks, before a bull can be deemed fit for breeding.



For example, a bull that will be used at 15 months of age with a mature weight of 1000kg needs to reach 400-450kg (a growth rate of 1.1kg per day) by approximately 11.5 months of age.

However a bull that will be used at 18 months of age only needs to reach 400-450kg (a growth rate of 0.9kg per day) by approximately 14.5 months.

Figure 6: Target puberty for breeding bulls



The EBLEX bull buyers' survey suggested that:

- More than 90% of commercial beef producers prefer to buy bulls at over 15 months of age
- 52% preferred bulls between 15-18 months of age

Targets for bull production

Target liveweights should begin with the end customer in mind. Deciding at what age the bull will be sold or more importantly, used for the first time, will determine the daily liveweight gain needed.

To achieve target weights, regular weighing and health monitoring are needed.

A good target to aim for is 70% of mature weight at 18 months of age.



Breeding from bulls at 15 months and beyond

Producing breeding bulls to be sold and used at 15 months of age can suit some systems as it frees up more grass for the cow herd and reduces the number of management groups on the farm at any one time.

There are also potential genetic benefits by reducing the time between each generation, as it increases the rate of genetic progress. However, prolonged periods of high growth rates can increase the risk of long-term health issues in bulls (see page 4).

Table 6: Target performance for bulls to be used at 15 months

	Period	Age (days)	Target weight (kg)	Daily gain (kg/day)	Feed (outside)	Feed (housed)
Heavy mature weight 900-1100kg	Birth at 45kg – weaning	200	305	1.3	Milk, grass and creep	Milk, silage and creep
	Weaning to 15 months	456	585	1.1	Temporary grass and clover leys	Supplemented good quality silage or TMR
Medium mature weight 700-900kg	Birth at 40kg – weaning	200	280	1.2	Milk and grass	Milk and silage
	Weaning to 15 months	456	510	0.9	Permanent pasture	Silage

Table 7: Target performance for bulls to be used at 18 months

	Period	Age (days)	Target weight (kg)	Daily gain (kg/day)	Feed (outside)	Feed (housed)
Heavy mature weight 900-1100kg	Birth at 45kg – weaning	200	285	1.2	Milk and grass	Milk and silage
	Weaning to 18 months	548	660	1.1	Temporary grass and clover leys	Supplemented good quality silage or TMR
Medium mature weight 700-900kg	Birth at 40kg – weaning	200	240	1.0	Milk and grass	Milk and silage
	Weaning to 18 months	548	550	0.9	Permanent pasture	Silage

Managing and working with young bull groups

Safety

Each year four to five deaths are caused by cattle on English farms, while one in five cattle producers are injured.

When working with bulls, caution must be taken

Risks include:

- A cluttered environment
- Complacency - *"I have done this before, I know this animal well."*
- Older workers who are not quite as light on their feet as they used to be
- Lone working

At grass



Posting clear caution signs in field access points ensures all parties are aware of the risk from bulls that are loose in a field. It is also important to ensure field boundaries are secure including gates and fences.

It is illegal to graze beef bulls on fields with public access if they are not accompanied by cows or heifers

When visiting bulls, always have an escape route planned and keep close to a tractor or four-wheel drive vehicle which can act as a refuge.

Bull behaviour

Within any group there will be a social order. Not introducing new individuals into established groups avoids aggressive fighting and riding and reduces stress levels. If possible, keep bulls away from noisy farm activity.

Feeding and bedding in the morning and leaving the group in peace in the late afternoon and early evening, can reduce the risk of injuries. As the herd instinctively settles down for the night, it is likely that head-butting and pushing will occur in an assertive, but non-aggressive way, as long as they are not disturbed.

Excessive riding and fighting is an indication that something is not right with the ration

Managing mature, working bulls

It is important to monitor body condition and weight as a bull nears the time it is to be sold. Target a Body Condition Score (BCS) of 3.0-3.5 at sale.

Bulls should be in good condition, but not over-fat. The edges of the horizontal and spinous processes (bones) in the loin area should be able to be felt with light pressure and individual ribs should be identifiable by touch.

If bulls have already been used for mating, they should be assessed for condition loss.

Ensure a bull's body condition stays above 2. If his condition falls below this, it will prove difficult to get him back into condition for the next breeding season without special management.

As the grazing season progresses, grass quality can fall (if not managed correctly). If this happens, bulls will need supplementation to minimise condition loss.

If good quality grass or silage is not available, supplementing with 2-3 kg of 14% CP concentrates will help a bull gain condition.

Table 8: Example bull diet to gain 0.75 of a condition score over winter in a spring calving herd

Mature bull weight	DMI (1.5% of body weight)	Silage	Concentrates
1000kg	15kg DM	55kg fresh weight	2.5kg
700kg	10.5kg DM	42kg fresh weight	1.5kg

Target weight at 24 months

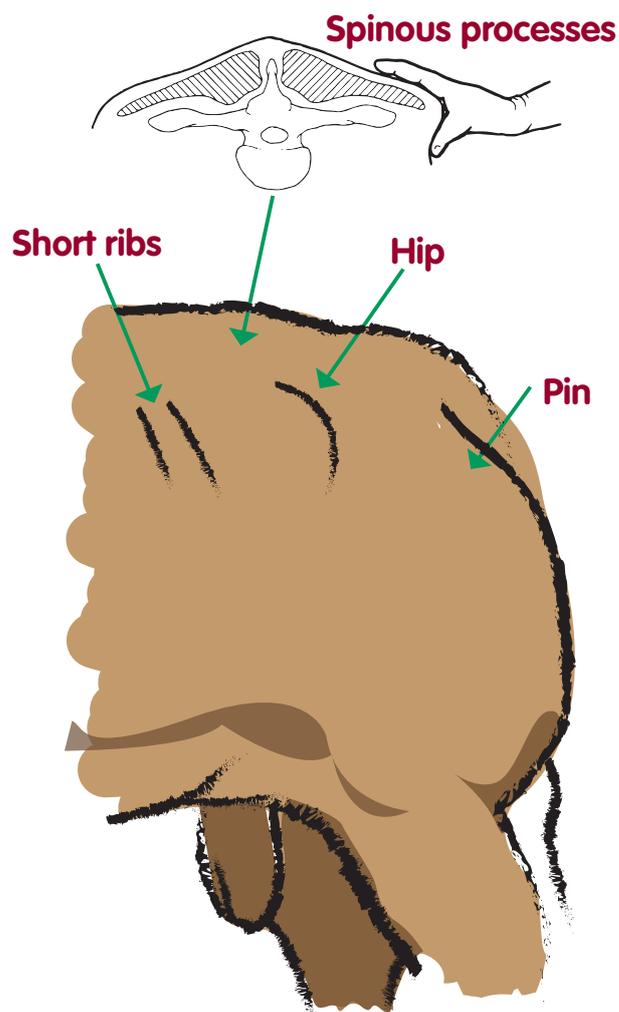
Although a bull may be sufficiently developed to serve cows at 15 months of age, his development does not stop there, as he is still not fully grown or mature.

A good target for bulls is to reach 85% of mature weight at 24 months of age.

Table 9: Example target bull weight gain 18-24 months

	Mature weight (100%)	Weight at 18 months	Target weight at 24 months (85%)	Target weight gain 18-24 months
Bull A	1000kg	670kg	850kg	1kg/day
Bull B	800kg	540kg	680kg	0.8kg/day

Figure 6: Feel the horizontal processes in the loin area to assess body condition



It is important to ask an experienced vet to perform a bull MOT or breeding soundness examination on breeding bulls **at least four weeks** before the start of the breeding season. The examination includes checking:

- Feet, legs and locomotion
- Scrotum and testes – measuring scrotal circumference and looking for abnormalities
- Body condition – ideally 3.0-3.5
- Semen quality – volume, density, motility and abnormalities
- Health treatments are up-to-date – vaccinations, internal and external parasite control

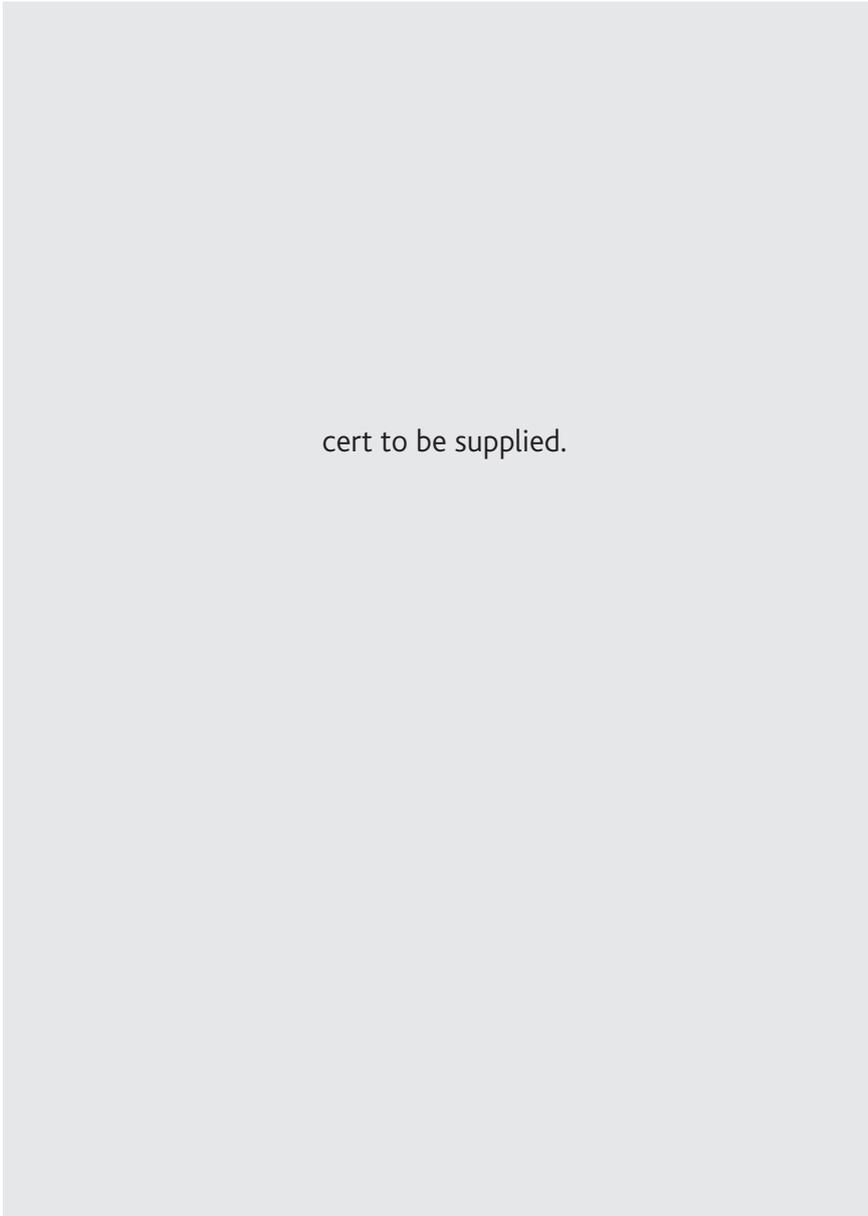
The EBLEX bull buyers' survey found that:

- Over 65% of pedigree bull buyers would pay more for a bull which has passed a bull breeding soundness examination

The EBLEX bull breeders' survey found that:

- More than 40% of breeders had never had a pre-sale bull breeding soundness examination performed

Having bulls examined prior to sale not only provides a useful marketing tool, it can also act as supporting proof that a bull is fertile if buyers later question a bull's fertility.



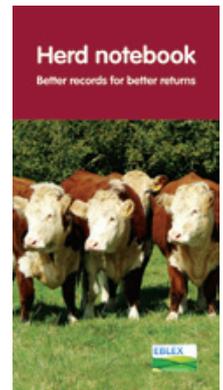
cert to be supplied.

Health planning

Breeding bulls can easily spread disease between and within herds. Herd health planning is therefore essential to ensure the bull is up-to-date with all testing, treatments and vaccinations before sale.

A herd health plan should be developed in partnership with the farm vet.

Consult the vet before making significant changes to the existing system, as the disease risk may change. It is important to put precautions in place.



Bulls are susceptible to a range of diseases and more information can be found in the **BRP Beef diseases directory**.

Further information on controlling worms and liver fluke is available in the **EBLEX BRP Beef manual 9 – Controlling worms and liver fluke in cattle for Better Returns**.

Use the **Herd notebook** to record key physical data about each animal.

Good health status

The EBLEX bull breeders' survey found that more than 80% of breeders are in a disease health scheme.

Herds that have health plans and conform to Cattle Health Certification Standards (CHeCS) for BVD, Johnes, Leptospirosis and IBR will have a commercial advantage when selling bulls.

Encourage clients to give the bull a period of quarantine/adjustment for a minimum of four weeks before starting work. It will reduce the chance of disease being brought into herds. The stress of moving to a new environment can also temporarily reduce fertility in some bulls.



Ali Jackson, Stockman

Solway View British Blues and Limousins, Dumfries & Galloway

"Having and maintaining a clean herd is essential. For us and our clients it's important to know that you won't bring anything into the herd when buying an animal."

We are currently in a CHeCS approved health scheme for BVD, Johnes and Leptospirosis and all animals brought onto farm are blood tested and isolated until we get the all clear.

The scheme we are in is very reliable, especially for sales. We send away the bloods and they send a name card with the animals' details to use at the sale so that buyers can easily see the health status."

Name: BEST BEEF OUT		Ear Number: UK123456 789101	
DISEASE	HERD ACCREDITED (YEARS)	INDIVIDUAL TEST RESULT	VACCINATED
BVD	1	11-Jan-13	11-Jan-13
IBR		11 Jan 13 (MARKER)	04-Sep-12 (MARKER)
LEPTO		11-Jan-13	
TB 4	Jan-13		
JOHNE'S	Risk Level 1 3 years		

Information Applies to 2013 Spring February Sale

This animal has tested free of BVD virus or is from a BVD accredited free herd.

CHeCS
hi health herdcare

Marketing 'Fit for Purpose' bulls

Breeding 'Fit for Purpose' bulls may alter the way bulls are best marketed. For example, there may be a need to increase off-farm sales, where the genetic merit and robustness of the bull will be more appreciated.

Other ways to promote the herd

Communicating directly with existing and potential customers

Building a contact list of customers and communicating regularly with them will encourage producers to buy bulls off-farm, potentially earlier in the year.

Measuring the performance of a breeding bull does not have to end when it is sold. Gathering information on how bulls perform from your customers can build customer relationships and the feedback used as a marketing tool, eg as case studies for articles or adverts.

Using website and social media

Marketing on the internet can be free by utilising social media sites like Twitter and Facebook. These are good tools for raising brand awareness amongst 'friends' and 'followers'.

Setting up a website costs money but the amount can vary from under £100 for a DIY version to over £1,000 to have one designed professionally. The internet provides opportunities for cheap advertising and can also promote herds to breeders from around the world.



Rob Evans

Wroxall Simmentals, Warwickshire

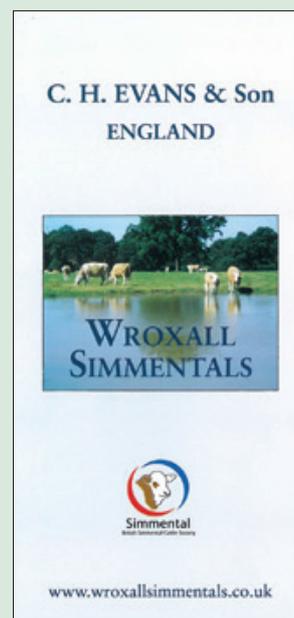
"Thinking about the customer is one of our highest priorities.

From my experience, many buyers shy away from asking questions, so we set up an easy-to-use website and produced leaflets that are available everywhere we go.

Clients will often pick up a leaflet in the summer, have a read, look up the website and then we get a phone call a few months later.

My wife Sam runs the website and keeping it up-to-date is important. If it has new updates then people are more inclined to keep coming back.

We can get reports that show us how many people have viewed our web pages and which country they are from. It's quite exciting when you see that people from Canada and Denmark are looking at your herd. We recently sold semen to breeders from Australia after they had looked at our website."



Hosting open days and evenings

Inviting existing and potential clients on to the farm provides an opportunity to present the farm philosophy and promote the benefits of buying direct from the bull's home farm.

Using the farming press

Local newspapers are good places to post adverts to market stock but can be expensive.

Communicating with and building relationships with journalists on magazines and farming papers will increase the chances of being approached to be featured in articles.

Energy and protein requirements for growing cattle

Table A1: Energy requirements for growing bulls

Total daily ME allowance for growing bulls (MJ/head/day)					
Liveweight (kg)	Maintenance + DLWG				
	0.50kg	0.75kg	1.00kg	1.25kg	1.50kg
200	41	49	59	72	91
300	53	63	76	92	116
400	65	77	92	112	139
500	76	90	107	129	160
600	86	102	121	146	181

Note: Energy requirements are calculated using standard equations for fasting metabolism, activity allowance and growth (and include a 5% safety margin)

Table A2: Protein requirements for bulls

Protein requirements for bulls	
Cattle type	CP% in DM
Growing bulls	14-16
Mature bulls (over 24 months)	12-14

