

# Profitable Beef Breeding



**HYBU CIG  
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MEAT PROMOTION WALES

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## Preface

In order to enjoy a sustainable future the Welsh beef industry must continue to improve the quality of product and the efficiency of production. The Welsh Beef Quality Improvement Project (WBQIP) has played a key role in this and has provided a valuable platform for Welsh farmers to build on.

Profitability is key to the success of the Welsh beef herd and HCC is working closely with the beef industry to see that best practices are implemented.

The successful Welsh Beef Quality Improvement Project has trained 680 farmers and assisted in the purchase of 325 bulls. These bulls are of a high genetic merit for commercially important traits and will allow continued progress in the goals of beef producers.

This booklet concentrates on those aspects of production that are closely linked to profitability; bull selection, herd fertility, herd health, calf management and replacement policy. In all sections it refers to figures specific to the Welsh industry which were collected from surveys or from the training courses that formed part of the WBQIP.

Through the implementation of recommendations and information given in this booklet Welsh farmers will be able to continue developing their businesses while ensuring consumers get a quality, healthy product.





# The Welsh Beef Quality Improvement Project (WBQIP) improving efficiency of production

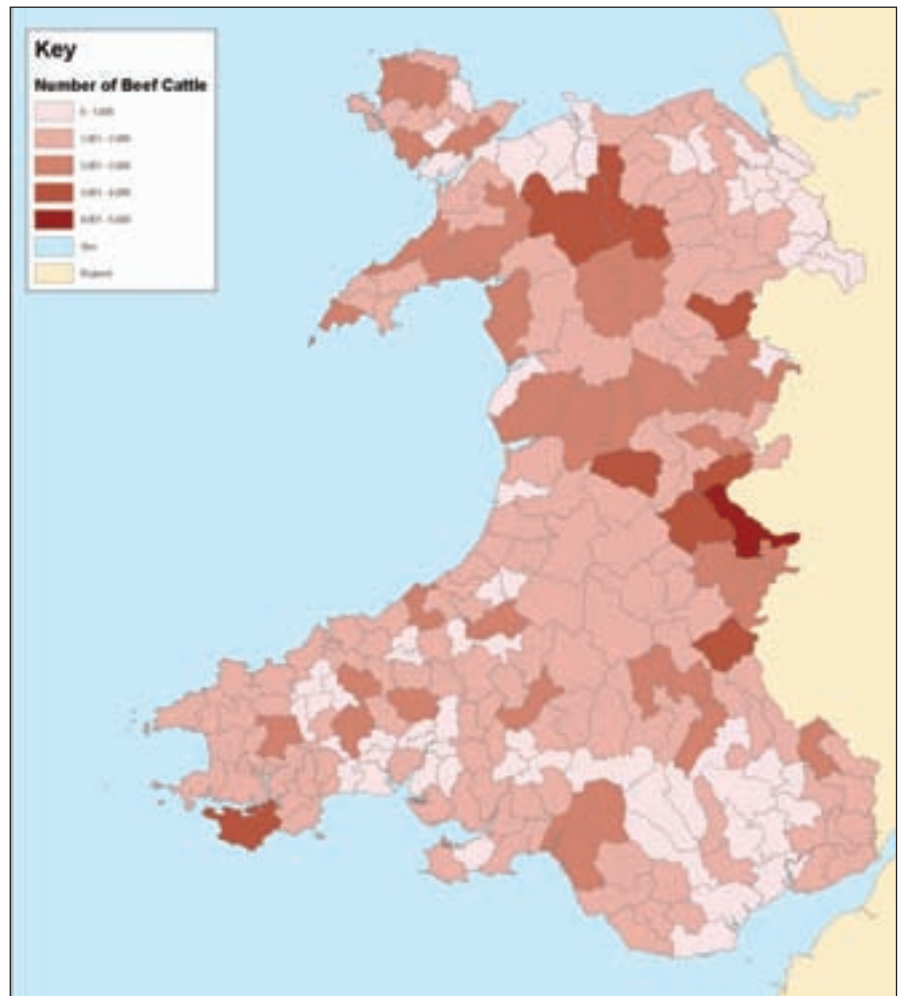
## 1.1 Industry background

In 2008 the Welsh beef herd consisted of 348,000 breeding animals which make up 13% of the UK beef breeding herd. The distribution of these cattle throughout Wales is shown in Figure 1.

Welsh beef, like Welsh lamb, enjoys EU Protected Geographical Indication (PGI) status that provides the consumer with confidence that they are eating a quality product. There is tremendous potential to exploit this to improve the profitability of this sector.

Cost of production research initiated by HCC has shown a huge variation in the physical and financial performance of individual beef enterprises. It is important that individual producers know what it is costing them to produce beef in order to see where improvements can be made. Up to date cost of production figures and advice on improving these figures to boost profitability can be obtained from HCC.

Figure 1. Beef cattle density in Wales, June 2007



Source: GI Services Branch, DEPC, Aberystwyth ©Crown Copyright

## 1.2 Aims of the project

Funded by £2.2m from the European Union and the Welsh Assembly Government, the remit of the WBQIP was 'to provide beef farmers with skills which will equip them to develop their enterprise to become more efficient and sustainable'. A training programme was designed to enhance the ability of Welsh livestock producers to select bulls which would help to meet the objectives of their particular beef enterprise and finance was provided to purchase bulls of superior genetic merit. The bulls had to be in the top 10% of its breed for 400 day growth or muscle depth and not be in the bottom 10% for calving ease. The project was further supported by grant-aided performance recording of pedigree and commercial progeny.

The objective of the programme was to increase the quality of the progeny from the Welsh suckler and dairy herds resulting in higher returns to producers and leading to a more competitive Welsh industry. HCC figures indicate that if 50% of calves born in Wales were sired by a top 25% bull, as opposed to sires of below average genetic merit, the benefit to the Welsh industry would be around £3.6m per annum. The information provided in this booklet uses data collected from the Welsh beef breeders who participated in the programme and is based on sound breeding principles and the latest scientific research.



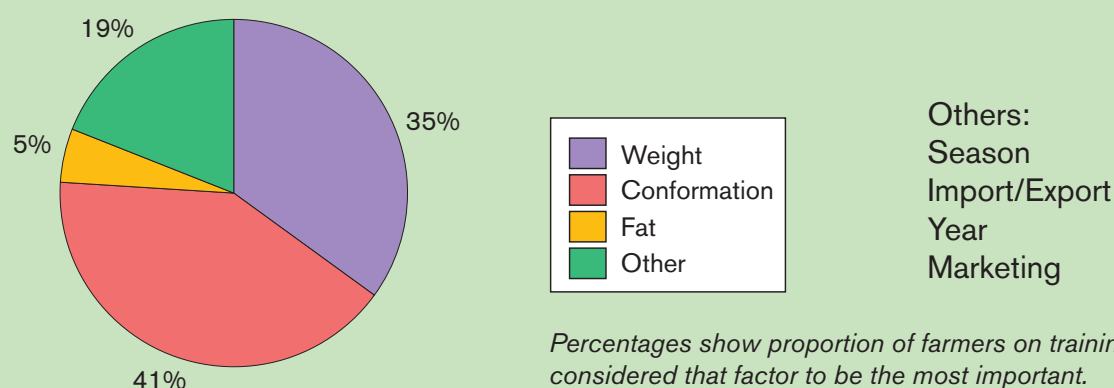
# Selecting the Correct Bull

## 2.1 Understanding bull selection

Superior breeding animals cannot be selected by visual appraisal alone. Selection based on genetics together with a visual assessment of their health and conformation will lead to the purchase of sires which will benefit herd productivity and profitability.

Participants in the WBQIP were asked to prioritise 6 features that they believed influence market prices (Figure 2). It was evident that the features chosen as most important are those which are greatly influenced by genetics i.e. growth and conformation. As a result correct bull selection can have a significant impact on the productivity and profitability of the calves produced.

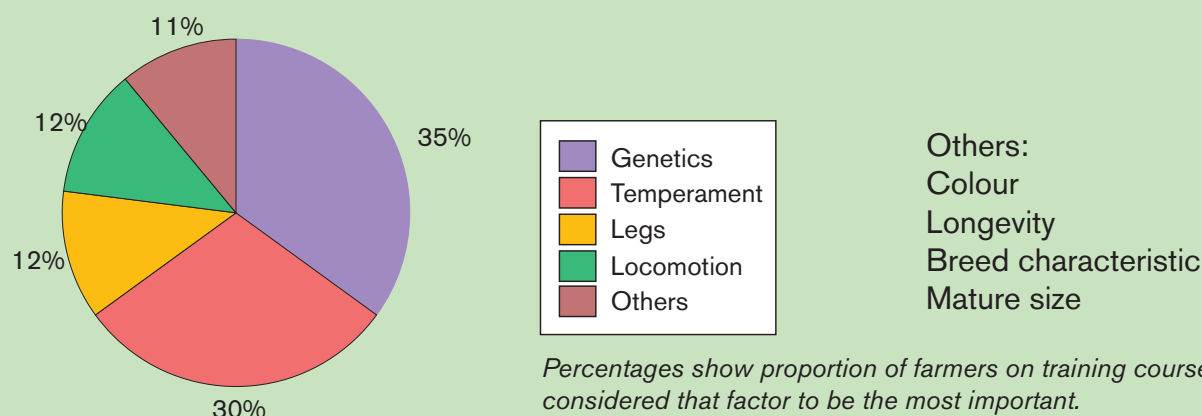
**Figure 2. What influences livestock market prices?**



## How important are genetics to the Welsh producer?

Figure 3 shows the results when farmers were asked what are the most important considerations when selecting a new bull. The genetics of the bull and his functionality are seen as the most important traits in bull selection to Welsh farmers. The need for calves which are born easily, grow fast and are of good shape is recognised but interpretation of genetics is often misunderstood. With the reduced labour on farms easy managed cattle are paramount and selection of bulls of sound temperament is seen as vital.

**Figure 3. What do you consider when selecting a new bull?**



# Selecting the Correct Bull

A comprehensive and accurate system is available to assess the genetic merit of animals using pedigree and performance records and the results are presented as Estimated Breeding Values (EBVs). Some EBVs are also weighted for economic value to form indexes. Generally the index gives the overall merit of the animal but the EBV gives the precise detail that can assist farmers when making their final selections.

EBVs are produced in the UK for all breeds by either Beefbreeder (Signet Breeding Services) or Breedplan (ABRI).

## **Producer's view**

Eric Land of Llanddeiniolen was aware of EBVs but found the WBQIP training courses invaluable in furthering his understanding. He now appreciates the need to consider the correct balance of EBVs. By performance recording his calves he is already seeing the benefits of his top 1% bull purchased with aid from the WBQIP.

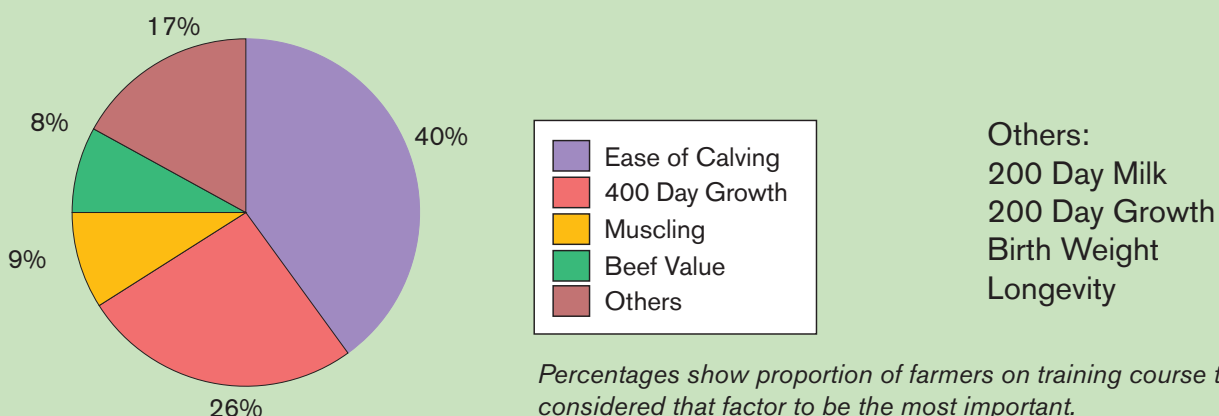
**More information on EBVs can be found in the Bull Buyer's Guide available from HCC.**

## **2.2 The terminal sire**

Selecting the right bulls as terminal sires is crucial to any beef breeding programme. Welsh breeders identified that calving and 400 day growth are the essential EBVs necessary for a suckler production system where calves are to be finished (Figure 4). However it should not be forgotten that cattle are being produced for an end market and consideration should also be given to EBVs for muscling and possibly, fat.

It is likely that producers will have slightly different criteria when buying a bull depending on whether his progeny are sold as stores or sold finished. The critical feature for both is that the bull needs to sire calves which are born easily. Large calves and long gestation can increase calving difficulty and may result in dead and injured cows or calves. Calving difficulties can also affect the ability of that cow to get back in calf which in turn will affect profitability because cows will not be calving on a regular annual basis.

**Figure 4. Essential traits when breeding cattle for finishing**



*Percentages show proportion of farmers on training course that considered that factor to be the most important.*



# Selecting the Correct Bull

Bulls are bought for a purpose and some of the questions that need to be asked by the terminal sire buyer before purchasing a new bull are;

Do I need a bull to improve my calf growth rates?

Do I need a bull to ensure quicker finishing?

Do I need a bull so that I get heavier carcasses before cattle get overfat?

Table 1 lists some of the EBVs of most importance for terminal sires.

**Table 1 EBVs for Terminal Sires**

Suckler Producer		Dairy Producer	
Selling suckled calves	Finishing cattle	Selling calves	Finishing cattle
Calving ease-direct	Calving ease	Gestation length	Gestation length
Birth weight	Birth weight	Calving ease	Calving ease
200 day growth	400 day growth	Birth weight	Birth weight
Muscle depth/area	Muscle Depth/area		Muscle Depth/area
	Fat Depth		

If a terminal sire is being used on heifers it is essential to consider the EBVs for gestation length and birth weight.

## **Producer's view**

John Owen of Pennant sells finished cattle and wanted to increase the numbers obtaining top grades. The WBQIP assisted his purchase of a top 1% Aberdeen Angus bull. He was already aware of the impact of EBVs on farm businesses in Australia and New Zealand and was keen to adopt the same approach at home.

Selection of the sire will also be determined by the cow type on the farm. For example, a small cow type of good conformation will benefit from a sire chosen for growth rather than muscle traits.

If your farm focuses on producing cattle to sell as stores then the 400 day growth EBV, together with those for muscle and fat will help you maximise their potential.

## **Producer's view**

Terrig Morgan of Mold runs 130 dairy cows and uses Holstein Friesian AI on his best cows. The superior beef bull bought through the scheme will increase the value of his cross calves and boost the total income from the unit. The finisher of these calves will also benefit from a superior product.



# Selecting the Correct Bull

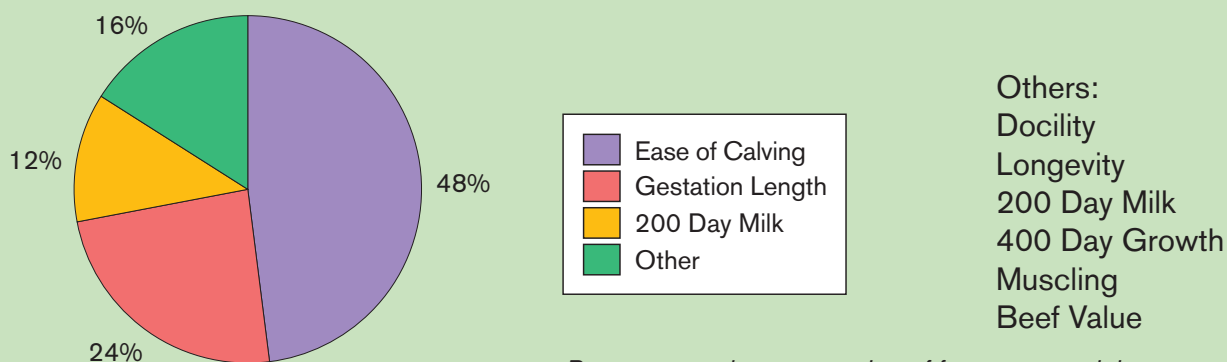
## 2.3 The maternal sire

Increasingly producers are 'closing' their herd and breeding their own replacements. This helps to minimise health breakdowns and to improve the quality of the breeding female and the subsequent calf crop. The bull used now will have an effect which will last for many years and purchasers need to source the bull with the correct balance of maternal EBVs to meet their needs.

Welsh farmers were asked which maternal EBVs they consider of importance when;

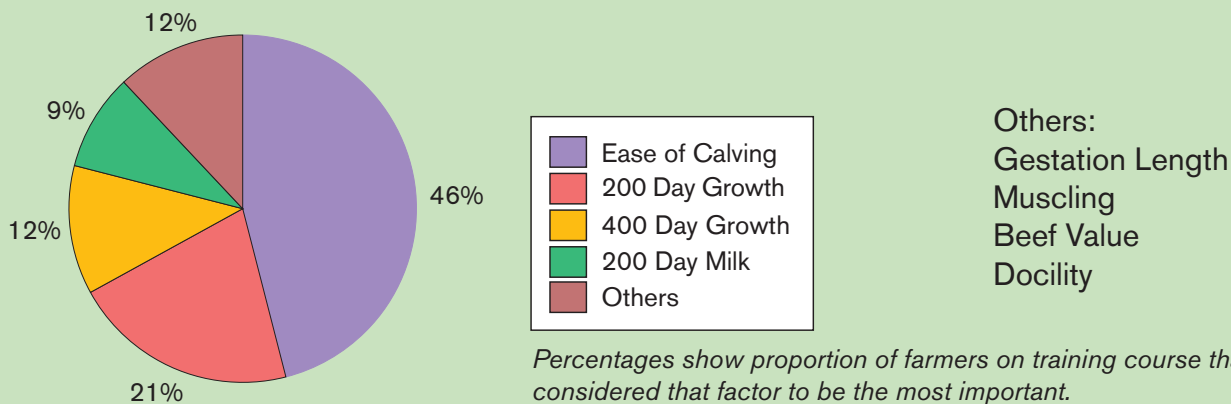
- a) producing beef cross breeding animals from a dairy herd (Figure 5)
- b) selling stores but retaining own heifer replacements from a suckler herd (Figure 6)

**Figure 5. Important traits for beef crosses from the dairy herd**



*Percentages show proportion of farmers on training course that considered that factor to be the most important.*

**Figure 6. Important traits for stores and heifer replacements from the suckler herd**



*Percentages show proportion of farmers on training course that considered that factor to be the most important.*

# Selecting the Correct Bull

A common problem with the modern suckler cow is that she can be too big. Although this is a benefit when she is sold at the end of her working life, it is likely that she will have consumed more feed and forage hence making her more expensive than a smaller cow. Picking the correct bull to breed replacements is therefore crucial and care should be taken if selecting higher 400 day growth EBVs to increase the size of the male calves as this will result in increasingly big suckler cows.

The ideal suckler cow will be of moderate size, calve easily and regularly, get back into calf quickly, milk well and wean a good quality calf that has grown well since birth.

When selecting it should be remembered that a good overall balance of EBVs must be achieved i.e. if selecting a bull with top 10% milk EBVs, you must ensure he is not below average in other important EBVs.

## ***Producer's view***

Gwion Owen from Ruthin was pleased to find that buying a bull using figures has taken the guesswork out of the purchase process. He is grading up his herd of cows and looking at EBVs for calving ease and maternal traits in the bull. Heifers born will go to another bull with good performance figures so that the resultant progeny will finish quickly, use less feed and be cheaper to look after. The progeny from his superior bull are already outperforming those born to his unrecorded bull.



Breeding calves that are born easily without having an extended gestation length and achieving tight calving periods will have a huge impact on the economics of suckler production.

When selecting a bull to produce female replacements the following questions are commonly asked;

When breeding my own replacements can I buy a bull that also produces good shaped steers for sale?

How do I find a bull whose daughters calve at 2 years of age?

Do I need a bull to reduce the mature size of my cows?

# Selecting the Correct Bull

Maternal value is the EBV that identifies the overall economic value of an animal's genetic ability to produce breeding females. Maternal traits are listed in Table 2.

**Table 2 Key Maternal Traits**

200 day milk	Maternal weaning weight
Gestation length	Maternal calving ease or Calving ease daughters
Age at first calving	Cow weight = Maintenance value
Longevity	Scrotal size
Calving interval	

## 2.4 Gene markers as a selection aid

### 2.4.1 What are gene markers?

There are currently a number of gene marker tests commercially available that can test an animal's type for traits such as meat tenderness, level of marbling in the meat and feed efficiency. Gene marker testing will explain some of the genetic variation for these traits and helps to predict an animal's performance by testing for DNA markers that have an effect on those traits. This is particularly useful to identify animal's with characteristics that are otherwise not easy to see or measure.

### 2.4.2 How do you test for gene markers?

Any part of an animal that DNA can be extracted from can be used to do the DNA testing. This is usually hair samples but it can also include semen, tissue and blood. The samples will give the same result at whatever age the animal is tested as DNA does not change. This allows farmers to start making selection decisions when their stock are still at a young age.

### 2.4.3 What do the results mean?

An animal will inherit a copy of each marker from each of its parents and so the results reflect the number of positive markers that are present for each trait. The more markers an animal has for a trait, the better the animal is likely to perform for that trait. For example, the more positive markers an animal has for tenderness, the more tender (or less tough) the meat from that animal is likely to be.

### 2.4.4 How can farmers benefit from using gene markers?

Gene marker testing does not replace the need for optimal nutrition and management for cattle to reach their genetic potential, but gives extra information on an animal's genetics to help sort and select animals for breeding purposes.

# Selecting the Correct Bull

Traits like feed efficiency are of economic importance to all sectors of the beef industry, as it can identify animals that will eat less than their peers but perform at a similar level in terms of their weight gain. Substantial efficiency can therefore be gained in both grazing and finishing systems by selecting and/or culling animals according to their feed efficiency gene marker results.

Farmers should try to select and breed for animals with more copies of the important genes. For example, when selecting a bull, a farmer should look for a sire that has two positive copies (homozygote) of each marker to ensure that he always passes one copy to his offspring.

Further research will add to the number of gene markers that can be tested for and there will also be the potential to incorporate gene marker results into breeding values. This means that pedigree and commercial breeders will be able to make more accurate decisions about these additional traits when they are selecting animals for breeding.

## ***Producer's view***

Colin Evans, Rhuddel Polled Welsh Blacks, is a Welsh beef producer already making use of gene marker technology. Colin recently DNA tested all his stock bulls and pedigree females and will use the results to help make breeding and selection decisions. Individual animals will be assessed on their gene marker results, their current performance in the herd, as well as their type, conformation, temperament, mothering ability and hardiness. Colin says, "Meat tenderness is the biggest factor contributing to consumer satisfaction in the beef industry and DNA testing enables me to breed animals with more tender meat."

As a result of the gene marker testing, Colin will now ensure that any bull he purchases has above average results for marbling, tenderness and feed efficiency to ensure that he can continue making the genetic progress he desires for these traits.



# Selecting the Correct Bull

## 2.5 A bull or AI?

It is well recognised that the major artificial insemination (AI) organisations operating in the UK are sourcing bulls with good EBVs. If these were used across the UK cattle population there would be a rapid improvement in genetic merit. However, there are labour and management factors that make the use of natural service more suitable for the majority of Welsh farmers.

Although many producers successfully use AI in their breeding policy it is recognised that AI can be difficult to manage especially at grass due to difficulty in heat detection and the labour involved in bringing cows to AI. A survey undertaken by HCC<sup>1</sup> showed that 33% of herds used AI but only 7% of cows were bred to AI.

Responses from 650 Welsh farmers on the relative merits of a bull and AI are listed in Table 3. The majority rated oestrus detection and labour involved as the main drawbacks of AI but respondees were unanimous that AI enabled access to superior genetics. AI can be used selectively within a pedigree or commercial herd to address specific objectives and it permits the purchase of genetics that would otherwise be too expensive for many producers. However, natural service will remain the mainstay for most herds because of its convenience and reliability.

**Table 3 A Bull or AI**

<b>Bull</b>	<b>AI</b>
Convenient	Higher genetic merit at lower cost
Heat detector	No chance of infertile animal
Labour saving	No disease risk
Less handling	Defined calving period
Serves at correct time	No bull to keep for 365 days
Can manage temperamental cows	Use to breed replacements



# Selecting the Correct Bull

## 2.6 A Welsh beef producer's view

Wyn Williams are producers with a large suckler herd. They farm 156 hectares near Holyhead, Anglesey and grow 24 hectares of barley or oats with the rest of the land down to grass.

A change in farm policy in 2007 saw the sale of 1600 ewes, and 121 hectares of rented grass being surrendered. This meant one less labour unit being required.

Their aim is to increase the suckler herd from the current figure of 220 cows to 250 cows over the next 2-3 years.

Within the suckler herd the number of first cross Holstein cows is being gradually reduced with a beef type cow now favoured. Twenty-five replacements are bought each year and some home-bred heifers are kept. A close eye is kept on the heifers carrying increasing amounts of beef blood so that fertility and calving ease are not compromised.

The suckler cows are outwintered on sandy land and calve outside from 1st April. Currently over 90% of females calve by the end of June making the calving period approximately 13 weeks long. The intention is to tighten the calving period further with a target period of 10 weeks being aimed for.

Calves are weaned in January and mainly sold as yearlings, having been indoors for only three months. The farm currently has five stock bulls and also uses AI on some cows. Having been on the WBQIP course the bull purchasing policy has now changed with greater emphasis on selecting appropriate bulls to meet the farm's requirements.

Wyn attended one of the first WBQIP courses, and is already putting the theory into practice. Although initially sceptical about being 'taught how to buy a bull' he has found that:

1. Although he was aware of EBVs his understanding of them was not comprehensive and the course has improved his knowledge and ability to make use of them;
2. He now evaluates the bulls on paper prior to buying at a sale;
3. He now buys using EBVs together with a visual assessment of health and type;
4. The net margins on the farm could improve through better growth rates, better calves and easier calving;
5. Performance recording the calves is vital to success.

The grant aid available was used to buy a Limousin bull and Wyn decided that calving ease had to be a high priority for the bull to be used on heifers. The first crop of calves were born easily and this vindicated his purchase decision.

Wyn says that he will continue evaluating ways of improving his suckler system by adopting best practice to make it increasingly sustainable.





# Herd Fertility – a Key Factor

## 3.1 The five key principles to improve fertility

- Good management of bulling heifers
- Ensuring the soundness and fertility of bulls
- Correct managing of cow condition and nutrition
- Avoidance of difficult calvings
- Maintaining herd health ( section 4 )

### 3.1.1 Management of bulling heifers

#### Key points

- Sexual maturity is related to **weight** rather than age
- Ensure that heifers reach their target bulling weights ( Table 4 )
- Heifers born earlier in the calving period are likely to be heavier at bulling
- Heifers selected for maternal characteristics tend to be more fertile than others
- Early maturing breeds reach sexual maturity at lower weights than late maturing breeds
- Mature weight is reached at about 5 to 6 years of age
- A compact mating period as heifers will lead to a compact calving period as cows
- Manage first and second calvers independently from the main herd to avoid bullying

**Table 4 Target heifer bulling weights**

Cow weight kg	targets as % of mature weight		
	First mating	Second mating	Third mating
	65%	85%	95%
600	390	510	570
700	455	595	665

Heifers that are below their target bulling weight might get in calf easily at their first mating but it is likely that they will struggle to get in calf for their second calf. This is because they need to raise a calf, grow frame, and maintain body condition.

- Heifers need to grow at an average liveweight gain of 0.85 -1.0kg/day from birth.
- First and second calvers need separate management both at grass and when housed, in order to achieve target bulling weights.
- The cow is programmed to look after its calf as its first priority and will sacrifice its own body condition.

First calvers often take up to 20 days longer to come into heat (oestrus) following calving compared with mature cows. In order to avoid a prolonged calving period in the future heifers can be mated 3 weeks before the main cow herd.

# Herd Fertility – a Key Factor

Cow fertility has a major influence on the financial performance of a suckler herd. An HCC survey in 2006<sup>1</sup> indicated a wide range in herd fertility performance indicating that different management systems are having an effect on the fertility of the herd. This chapter outlines key areas that should be addressed to maximise the performance of your stock.

## 3.2 Benchmarking herd fertility

Few farmers can readily provide herd fertility information but this information is essential to monitor the performance of the herd.

**Table 5 Fertility benchmarking – an example**

<b>Spring Calvers 2007</b>		<b>Combined</b>		<b>Target</b>
<b>Cow/heifer fertility</b>		<b>Number</b>	<b>%</b>	<b>%</b>
Cows/heifers to bull		120		
Cows/heifers calving (herd fertility)		110	91.7	95%
Cows/heifers barren (barren rate)		8	6.7	5%
Cows/heifers aborting		2	1.7	
Cows/heifers mortality		1	0.8	
Cows in calf but culled		0	0.0	
Calves weaned/cow mated		106	88.3	94%
<b>Cow/heifer calving pattern</b>	<b>Calving spread</b>	<b>Number</b>	<b>%</b>	<b>%</b>
Cows/heifers calving 1st cycle	3 weeks	49	44.5	65%
Cows/heifers calving 2nd cycle	6 weeks	35	31.8	25%
Cows/heifers calving 3rd cycle	9 weeks	14	12.7	7%
Cows/heifers calving 4th cycle	12 weeks	7	6.4	3%
Cows/heifers calving 5th cycle	15 weeks	5	4.5	
Cows/heifers calving later		0	0.0	
Total calving		110		
<b>Herd performance</b>		<b>Number</b>	<b>%</b>	<b>%</b>
Cows/heifers with stillborn calves*		2		
Twin births (live twins only)		4		
Total born alive		112		
Dead calves (birth-48 hours)		4	3.6	2%
Dead calves (48 hrs - weaning)		2	1.8	combined
Calves weaned/calves born alive		106	94.6	96%

\* Excludes cows that have aborted

Source: Scottish Agricultural Collage (SAC)

# Herd Fertility – a Key Factor

To better identify the cause of problems, herds should be split into cows and heifers. Herds calving in different periods also need to be looked at separately. Table 5 shows an example of a report, with actual herd figures compared to target figures. Cow and heifer data is combined in this instance. By collecting data in this format farmers can see at a glance how their herd is performing and identify areas that need improving.

## What does the information in Table 5 tell me?

In this example, **herd fertility** is 91.7% as against the target of 95%. Herd fertility is paramount to the success of a herd - poor fertility results in a lack of calves or erratic breeding profiles.

**The barren rate** is higher than the target figure (6.7% v 5%) – the reasons should be investigated and the vet consulted.

**Calves weaned / cows mated** is at 88.3% as against the target of 94%. Calves weaned and sold are closely linked to profit. It is essential to explore the reasons for reduced productivity.

**Cows calving from 1<sup>st</sup> cycle** at 44.5% is well under the target of 65% - is the bull the problem?

The **Calving spread** is 15 weeks for the whole herd. The ideal calving spread is 10 weeks. Work on improving the herd fertility and this figure is likely to improve.

**Calf mortality** is high (3.6% v 2%). Is this due to disease, or just a difficult calving bull?

Benchmarking within the Welsh Beef industry is considered essential. The strengths in the production system must be maintained and any weaknesses pinpointed so that progress can be continual. Without basic information such as that highlighted above, it will prove difficult to increase productivity and hence, profitability.



# Herd Fertility – a Key Factor

## 3.2.2 Bull soundness and fertility

For a bull to be effective in his work he needs to be able to:

- Produce viable semen (sperm count and mobility)
- Identify cows in heat (libido)
- Able to serve (structurally sound)

Semen quality is the only one that cannot be monitored/checked by the herds person, so a fertility test by a vet can be very valuable.

**Table 6 Bull examination timetable**

<b>Bull examination timetable</b>	
Two to three months before mating	Check that all bulls are physically sound including their feet and legs
One month before mating	Bull soundness examination carried out by your vet
First few days of breeding	Bulls observed carefully to ensure they are mating properly

## 3.2.3 Managing cow condition and nutrition

### Key points

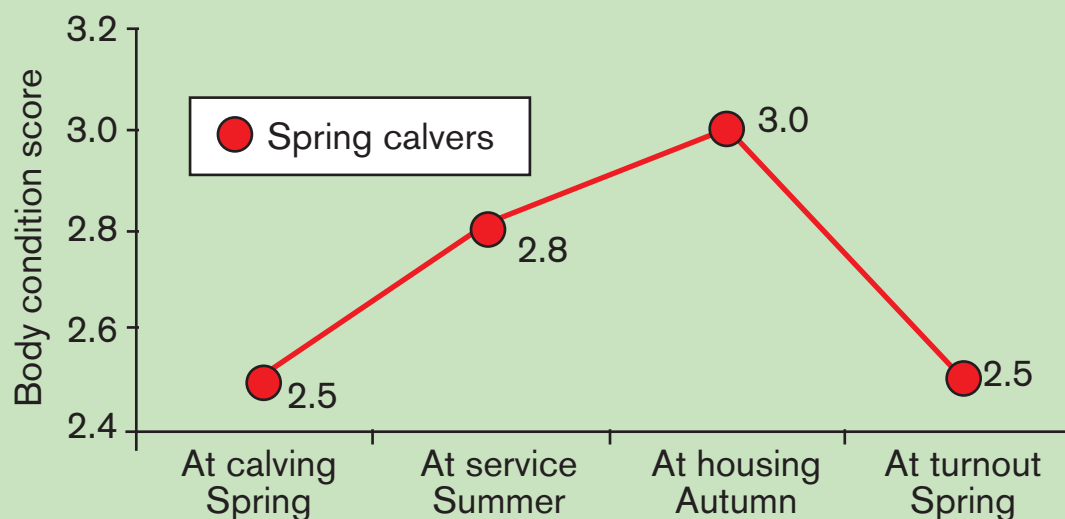
- Poor body condition is one of the major causes of poor fertility
- Manage cows to achieve target body condition scores at calving
- Manage thin cows and first calvers separately
- Review rations and forage quality each year ( see HCC nutrition calculator [www.hccmpw.org.uk](http://www.hccmpw.org.uk))
- Mineral deficiencies are an unusual cause of infertility, but specific supplementation is required in certain areas.

# Herd Fertility – a Key Factor

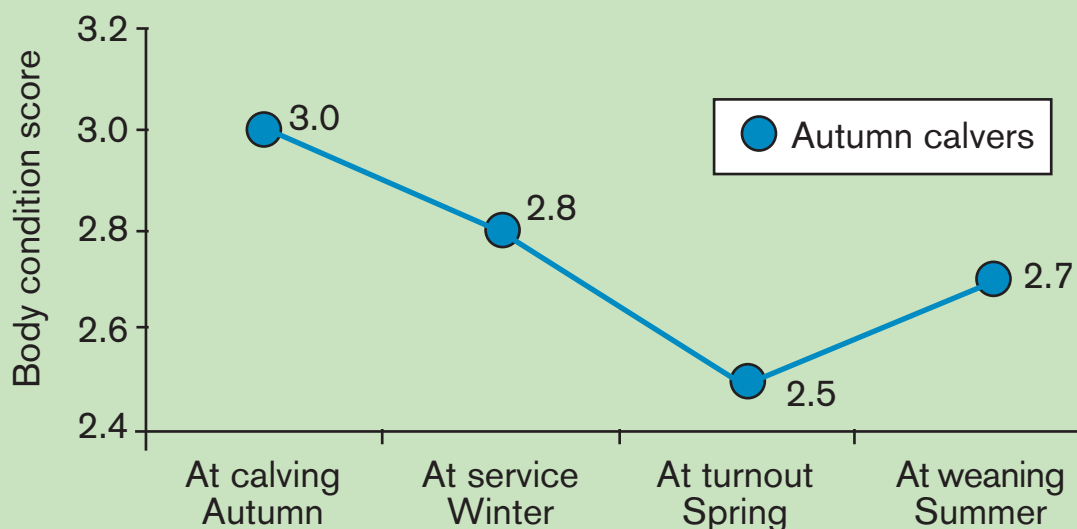
Cow condition must be managed on a year round basis to achieve target condition scores. Condition scoring cannot be done accurately by eye so cows should be handled using the 1-5 scoring system.

Target calving condition scores are 2.5 for spring calving cows and 3.0 for autumn calving cows (Figures 7 and 8).

**Figure 7 Target Condition Scores for Spring Calvers**



**Figure 8 Target Condition Scores for Autumn Calvers**



# Herd Fertility – a Key Factor

## 3.2.4 Avoidance of Difficult Calvings

Difficult calvings have a big impact on the future performance of the cow and the calf:

- Cow – delays return to oestrus, increases prospect of infertility at next mating, spreads the calving pattern and increases the replacement rate.
- Calf – can result in dead calves. Protracted calvings lead to weak calves that are unable to stand and suck colostrum from the cow. Calves that fail to get sufficient colostrum in the first 12 hours of life are more prone to disease.

### Key points

- Difficult calvings increase calf losses and reduce fertility
- Heifers are more at risk than adult cows
- Use EBVs to reduce the risk of difficult calvings
- Over-fat cows are slow to calve and have more difficult calvings than cows calving in the target condition score - watch autumn calvers
- Difficult calving are expensive on labour time
- Record cows who have assisted calvings and cull especially if they have more than one assisted calving.



# Herd Fertility – a Key Factor

## 3.3 The financial benefits of better fertility

Table 7 shows the financial impact of improving the fertility of a herd rearing a typical figure of 88 calves for every 100 cows and heifers put to the bull through;

- a) improvement in rearing percentage
- b) improvement in weaning weight through a tight calving pattern

**Table 7 Effect of Improvement in Fertility**

	current performance	improve % reared by 6 calves	improve weaning wt by 30kg
calves reared %	88	94	94
av weight per calf kg	285	285	315
av calf wt per cow kg*	251	268	296
average price £/kg	1.4	1.4	1.4
Output per cow	£351	£375	£414
Change in output		£24	£63
Change for 100 cow herd		£2,394	£6,288

\* Weight of calves weaned divided by number of cows and heifers put to the bull (includes barren cows and those that lost calves).

## 3.4 Advantages of a compact calving

**There are many ways farmers benefit from compact calving:**

- Calves born earlier in calving period are heavier at weaning than calves born later
- Late calving cows tend to get over fed which increases the risk of more difficult calvings
- Easier management of bigger batches
- Reduced risk of disease spread from older to more vulnerable younger calves
- More cows bulling at one time makes cows show heat behaviour more strongly
- More compact calving results in even batches of store and finishing cattle
- A larger pool of heifer calves at a suitable weight and maturity for bulling

# Herd Fertility – a Key Factor

## 3.5 Monitoring calf mortality

Hitting reproductive targets is the key challenge, but once the calf crop has been produced it is vital to keep calves free from disease to promote growth rates and to minimise deaths. Published figures indicate that there is a lot of room for improvement. The mortality figure derived from BCMS data (source: The RADAR Cattle Book 2006) showed that the death rate in beef calves in the first six months of life was 1 in 13 or almost 8%. These data do not include the deaths of very young calves that were not registered. As this is the period when calves are most vulnerable the mortality figure will significantly under-represent the number of deaths in the calf crop.

The annual average cost of calf mortality is estimated to be £3600 per 100 cows. Welsh survey<sup>1</sup> results indicate 3% of calves are born dead and a further 3.6% die before weaning (with a range from 0% to 20%). Another 1.1% die post weaning. The main reasons for these deaths were:

- a) at birth – calving difficulties and stillbirths
- b) birth to weaning – scours and pneumonia





# Herd Fertility – a Key Factor



## **The two key principles in reduction of calf deaths are:**

- a) Management of cow condition to facilitate ease of calving so that young calves are born full of vigour and are quick to top up on colostrum;
- b) Provision of hygienic conditions for the calving cow and young calves to help reduce exposure to infection.

To maintain calf mortality under 2% a simple recording system should be implemented which will allow analysis and fine-tuning of your management and health plan. Important details to include are:

- Age of calf at death
- Ease of birth
- Body weight at death (for calves that die in first two days of life)
- Age of dam
- Identity of bull
- Cause of death / veterinary diagnosis/ lab diagnosis.

Where there is any doubt about the cause of death the carcass should be submitted to your VLA centre for post mortem examination.



# Maintaining a Healthy Herd

Disease impacts on fertility, calf health and the longevity of breeding animals. An effective health plan is therefore essential for any beef herd that seeks to maximise efficiency.

## 4.1 Infectious Diseases

There are two important categories of infectious disease.

Firstly, there are infections responsible for calf scour and pneumonia. The organisms that cause these diseases are to be found in almost all populations of cattle. They take the opportunity to cause disease when other factors come into play. Therefore, where calves receive inadequate amounts of good quality colostrum and are in an environment where there is a large weight of faecal contamination then rotavirus, coronavirus and cryptosporidia are likely to cause calf scour. Similarly, where ventilation is limited respiratory syncytial virus (RSV), parainfluenza virus (Pi3) and several different bacteria could cause pneumonia. These diseases are controlled by addressing the factors that allow the disease and by vaccinating against the important agents. Hence in a herd with a calf scour problem vaccination against rotavirus may be beneficial. In herds where pneumonia occurs vaccination against RSV and Pi3 is recommended.

Secondly, there are infections that when introduced to a herd tend to cause disease independent of the husbandry. They often impact on fertility and are spread by infected carriers that show no sign of disease at the time of purchase. For the commercial breeding herd the important diseases in this category are Bovine Viral Diarrhoea (BVD), Johne's disease, leptospirosis and campylobacter. These diseases are controlled by a programme of biosecurity, monitoring (health schemes) and in some cases vaccination.

## 4.2 The Cost of Disease

It is difficult to obtain reliable data on the financial significance of the various diseases. The diseases detailed above impact on fertility and calf mortality. Examples of cost estimates for individual diseases are given in Table 8.

**Table 8 Cost Estimates of Disease**

Disease	Estimated losses	£ per 100 cows per year	£ per calf at risk
BVD	Infertility, abortion, mucosal disease and associated losses	£2200	NA
		13000	NA
Johne's disease	From 2% to 5% of cows culled per year	£1600	NA
Campylobacter	20% barren cows	£5300	NA
Calf Scour	Treatment costs and deaths	NA	£33
Calf Pneumonia	Treatment costs and deaths	NA	£21

NA: not applicable (ref. G. Caldow, Procs. British Cattle Breeders Conference, 2004, pages 13-16)

**For more information on specific diseases contact HCC or your veterinary surgeon.**

# Maintaining a Healthy Herd

## 4.3 Health plans & Health schemes

Health plans have become an integral part of stock management and allow the scheduled delivery of veterinary care to stock on a farm. The best plans use the farm's production data to identify problems that need to be addressed and then put in place a management programme using that information. They further allow the most cost-effective use of routine treatments. To get the best out of a health plan it should be regularly reviewed and updated. For the beef herd a review should be carried out at weaning to evaluate performance and again at the time the bulls are examined, when in addition to checking the bulls, calving performance can be reviewed.

Health schemes are a planned approach to the control of several infectious diseases (Johne's disease, BVD, Infectious Bovine Rhinotracheitis (IBR) and leptospirosis). They provide disease control blueprints to help with disease eradication but more importantly, they provide herd accreditation programmes that confirm the health status of a herd and allows the sale of animals with a disease free accredited status. They are based on sound biosecurity to keep the disease out (see below) and a testing system to demonstrate that the disease is not present in the herd. There are several providers of health schemes nationally, but all should be members of the Cattle Health Certifications Standards (CHeCS) and the CHeCS logo should appear on all herd certificates for them to be accepted as proof of accreditation.

## 4.4 Biosecurity

Several infectious diseases are spread through contact with apparently healthy carrier animals. Animals in the early stages of infection can also appear healthy only to develop obvious signs after a day or two, by which time they have introduced infection to your herd. Purchased breeding stock should be from accredited sources wherever possible and kept in isolation from other stock for one month. During that time the animals can be tested for any disease that is appropriate and be brought onto the herd vaccination programme. Control at farm boundaries, where contact can occur over fences with neighbouring stock is also important. Disease is also spread on equipment, personnel and food.

There should be a biosecurity module in every health plan to highlight the areas that pose a risk to the disease status of your farm. Table 9 outlines the degree of risk for each disease associated with buying in new animals. Table 10 highlights how disease can be spread once it has arrived on your farm and shows how to minimise this occurring.

# Maintaining a Healthy Herd

**Table 9 Risk assessment guidelines for common replacement policies in relation to BVD, leptospirosis, campylobacter and Johne's disease.**

Common replacement policies	Level of risk for each disease			
	BVD	Leptospirosis	Campylobacter	Johne's disease
Purchase virgin bulling heifers from accredited herds	Low	Low	Low	Low
Purchase virgin bulling heifers from herds of unknown status	Moderate	Moderate	Low	Moderate
Purchase in-calf heifers from herds of unknown status	Moderate to high	Moderate	Moderate	Moderate
Purchase of cows with calve at foot	Moderate to high	Moderate	Moderate	Moderate
Purchase young bulls that have not mated from accredited herds	Low	Low	Low	Low
Purchase, hire or share bulls that have been used in other herds	Moderate	Moderate	High	Moderate
Buy calf to set-on (Calf finished and not retained for breeding)	High	Low	Low	Low

**Table 10 Risk assessment guidelines for boundaries, equipment etc. in relation to diseases.**

Factor	Risk	Diseases	Action
Farm boundaries	Nose to nose contact with other cattle	BVD, IBR, TB	3 metre boundary or keep breeding stock away from farm boundary. Consider vaccination for BVD or IBR
Equipment and personnel	Spread of infection after contact with cattle on other farms	BVD, IBR, Johne's disease, Salmonellosis	Have separate protective clothing for high risk visitors. Have cleansing and disinfection before equipment or visitors contact cattle
Feed and bedding	Contamination from vermin	Salmonellosis	Sealed feed stores where appropriate
Streams running through farm	Spread of infection from farms upstream	Johne's disease, L Hardjo, Salmonellosis	Fence off running water for breeding stock.



# Achieving Calf Performance

## 5.1 Weight recording of commercial calves

Beef producers should ask themselves “am I managing my cattle or being managed by them?” In other words, do the animals decide when they are going to be fit for slaughter or sale or are they managed to ensure they only spend a defined number of months on the farm. Planning the number of days is a good way of managing growing or finishing cattle but only useful if linked to liveweight targets.

**Set a target for slaughter weight of 600kg for steers at 18 months old.** Having set a target, the next challenge is to achieve it. That means breeding or purchasing the right cattle, feeding them correctly and keeping them healthy. Regular weighing is the best way to know whether an enterprise is on track. It can highlight problems at an early enough stage to make changes that have the maximum impact on profitability.

Some producers still do not get their silage analysed and always feed the same amount of cereal with it. Depending on the quality of the silage, live weights over a 2 month period could differ by as much as 50kg! By weighing cattle regularly it is possible to identify when the diet needs to be improved to avoid the slaughter date being delayed, or the slaughter weight being reduced. Both of these outcomes would reduce profit margins.

Weight pays regardless of whether a producer is selling suckled calves, stores or finished cattle, so it makes sense to manage cattle to grow well and achieve heavy weights at sale. But how can this be done if weights are not monitored? In one month a growing beef calf can gain anything from zero to 45kg liveweight and a visual judgement will never provide an accurate assessment of weight gain. Running cattle through a weigh crush for the first time can be time consuming, but they do get used to it if it is a regular event.

Weighing cattle is also a way of getting cattle used to being handled and for assessing fat cover.

The weight records collected on 3,400 cattle through the WBQIP show that, on average, cattle gained 1kg/day with calves performing best up to 300 days old. Weight gains reduce as the animal gets older due to reduced feed conversion efficiency. The results also show that heavier calves at birth that required the use of ropes and jacks were then outperformed by lighter calves that did not receive any assistance during calving.

# Achieving Calf Performance

## 5.2 The benefits of creep feeding

Weaning is a stressful time for calves. They experience separation from their mothers, often a change of environment, different feeds and being housed with calves from different groups.

Creep feeding has numerous benefits:

- Increased weaning weights;
- Reduced weaning stress through the comfort of a familiar feed;
- Reduced incidence of pneumonia after housing;
- A smaller weaning check and better weight gain post weaning;
- Efficient feed conversion

The value of creep feeding depends heavily on the price of feed, therefore monitoring feed prices and budgeting is a vital part of calf rearing.

## 5.3 The time to wean

Time of weaning is often decided by the age of the calf, but cow body condition should also be taken into account. Weaning ages for spring born calves range from 6 months to 10 months and for autumn born calves from 8 months to just before the next calf is born. Calves can be weaned at any stage from 5 months of age onwards. The choice of time of weaning should strike a balance between managing cow body condition, maintaining the growth rate of the calf, and making the most efficient use of labour.

Cow body condition should be the key determinant. There is a strong case for early weaning calves when cows are in lean condition – at or below condition score 2 – for example during a dry summer when grass height is low and grazing is limited. Equally there is a case for delaying weaning in situations when cows are in good condition off grass – condition score 3 or above. The main benefit is through using the cow's body reserves to reduce the cost of feed through the early part of the winter.

To prevent cows getting over-fit and reduce the risk of summer mastitis calves can be allowed to suckle cows through to a few weeks before calving.

Later weaning tends to work best where cows are of a traditional or maternal type that can easily maintain body condition on poorer quality pasture or roughage. First crosses from the dairy herd or combinations of leaner continental breeds that lose condition faster when nutrition is poorer may justify earlier weaning. Earlier weaning is also recommended for first and possibly second calvers that need to put on body weight as well as maintain condition if they are to remain fertile.





# Replacement Policy – a key to performance

## 6.1 Hybrid Vigour

Hybrid vigour is the degree to which the crossbred progeny of a particular mating are better than their two parent breeds. While hybrid vigour can be used to enhance traits such as growth rate it actually has a far greater impact on traits of low heritability, such as fertility, milk yield and longevity. These traits, which are difficult to enhance through pure breeding, are greatly enhanced through crossbreeding – leading to improvements in calf survival, reproductive efficiency and calf growth rates.

When planning a crossbreeding programme it is important to consider whether you wish to maximise the amount of hybrid vigour in the calf, cow (maternal hybrid vigour) or both. Maternal hybrid vigour tends to lead to far greater financial benefits over time, due to the increase in overall productivity seen in crossbred cows compared to purebreds.

**Further information on crossbreeding programmes can be found in the HCC Bull Buyer's Guide.**

## 6.2 Pure Breeding v Cross Breeding

Pedigree herds have a large part to play in the production of stock bulls for the suckler herd and also regularly produce uniform, high quality suckled calves.

Numerically cross-bred herds are far more dominant and range from half bred cows (quite often half dairy), through various criss-cross breeding structures to a composite (e.g. Stabiliser).

Table 11 shows how WBQIP participants ranked the benefits of pure breeding, showing that herd management and disease control were important but appreciated that cross-breeding and hybrid vigour often favoured production.

**Table 11 Advantages and Disadvantages of Pure Breeding**

Advantages	Importance %	Disadvantages	Importance %
Ease of management	25	Lack of hybrid vigour	52
Closed herd/Herd health	22	Cost of new bloodlines Extra administration	17
Pedigree Sales	18		
Marketing and Sales	15	Reduced milk	15
Preservation of breed characteristics	10	Reduced performance	14
Consistency	10	Reduced market	1
		Reduced fertility	1

# Replacement Policy – a key to performance

## 6.3 Breeding v Buying Replacements

Herd size usually determines whether replacements are bred on the farm. In small suckler herds it would probably add a complication to management, especially if the aim is to market suckled calves sired by the terminal bull. Larger herds (i.e. 100+ cows) could purchase bulls with suitable maternal traits and use terminal sires on the remainder of cows not needed to breed replacements. As well as having control over disease there is also control over the genetic merit of the herd.

Table 12 shows the advantages and disadvantages of buying in replacements and how these factors were ranked by WBOIP participants.

**Table 12 Advantages & Disadvantages of Purchasing Replacements**

Advantages	Importance %	Disadvantages	Importance %
New bloodline	25	Health status	46
Better use of bull	23	Unknown genetic potential	21
Flexibility	22	Cost	16
Hybrid vigour	16	Temperament	13
Choice	14	Availability	4



# Conclusions

The utilisation of superior genetics and the implementation of best practices can have a significant impact on the profitability of the Welsh beef herd. This booklet has focussed on three key areas in particular which have a profound influence:

## Genetics

The experiences of breeders who participated in the WBQIP indicates that the traits which farmers most desire from a bull are those which are influenced by genetics, weight conformation and calving ease. This means that the use of EBVs can play a significant role in improving the performance and profitability of a herd.

## Fertility

Herd fertility has a major influence on the financial performance of suckler herds. Benchmarking and monitoring the performance of a herd is an essential tool which can help to identify poor performance. Being able to quantify barren rates, the percentage of calves weaned per cow, calving spread and calf mortality provides basic information which can be used to improve the management of the herd and yield financial benefits.

## Herd Health

Disease has a significant impact on fertility, calf health and the longevity of breeding animals. Diseases such as BVD, Johne's, Campylobacter, leptospirosis, calf scour and calf pneumonia can have a devastating impact on the profitability of a herd but can be controlled effectively by a programme of biosecurity, monitoring and where appropriate, vaccination. A working herd health plan that uses the farm's production data is key to a healthy profitable herd.

Focusing on these three key areas can have a significant impact on the profitability of a herd. The WBQIP has provided a platform for Welsh producers to achieve a common goal of producing a top quality product profitably.

Aled Edwards, Cilycwm, Llandovery breeds pedigree Limousins and endorsed the value of the training he has had received and maintained that on-farm buyers were now better informed at identifying trait EBVs rather than selecting solely on the final index figure. Previously buyers shied away from figures and bought on visual assessment. Calving traits were seen as a priority by many buyers. The encouragement to the pedigree industry to record and provide meaningful data to the commercial industry continues to be vital.

## Further Information

HCC have an extensive range of literature available to farmers on beef production including;

- Bull buyer's guide
- Beef producers' handbook "From gate to plate"
- Beef sires for the dairy herd
- Bull beef – costings and production systems
- Making the most of your finishing beef cattle
- Making the most of your suckler cows
- Practical beef cattle nutrition
- Controlling parasites in cattle – new guidelines
- DVD gate to plate

For further information on this booklet or the work of HCC, or to request one of the booklets listed above please contact

Tel: 01970 625050 or email [info@hccmpw.org.uk](mailto:info@hccmpw.org.uk)  
or alternatively visit the HCC website [www.hccmpw.org.uk](http://www.hccmpw.org.uk)