BETTER RETURNS PROGRAMME

AHDB
AGRICULTURE & HORTICULTURE DEVELOPMENT BOARD

Beef production from the dairy herd

Beef Manual 4

BEEF & LAMB

Contents

The information in this booklet was compiled by Dr Mary Vickers.

Photography: Genus Breeding, Limousin Cattle Society and Pennsylvania State University.

Introduction

Approximately half of all beef in England is a product of the dairy herd. Improving the quality of these cattle can bring economic benefits to everyone involved in the beef supply chain.

For many dairy herds, incorporating better beef sires into the herd's breeding plan goes hand in hand with the use of new technologies such as sexed semen. These tools are now widely used, enabling dairy farmers to breed heifer replacements from their highest genetic merit animals, while using high Estimated Breeding Value (EBV) beef sires on the rest to produce beef-cross calves of greater economic value.

For beef rearers, growers and finishers, it is important to source cattle with good EBVs in order to maximise growth rates and carcase quality.

Breeding is not the only critical area for cattle in the dairy beef supply chain. Calves that have received adequate colostrum and are healthy will achieve greater growth rates and require less veterinary intervention.

Adequate nutrition and housing throughout all stages of life are important to produce cattle that meet market specification.

This manual supplies producers with important information needed to achieve better returns, whether they are dairy farmers wanting to grow and finish their own calves, or beef producers purchasing dairy-bred calves.

Dr Mary Vickers
Livestock Scientist – Beef & Lamb

Opportunities to beef up returns

Beef calves and cull cows are an important output from a dairy herd and when managed carefully, can improve financial returns to the business.

Successful beef production depends on starting with the right type of calf, chosen to meet the requirements of the target market. It also needs to be fit and healthy, having consumed adequate levels of colostrum during the first 12 hours of life.

Markets exist for many breeds and type of calves, but understanding at the outset the market that is being targeted and its particular specification is critical for success.

Calves for beef production

A beef-cross calf is worth over £180 more than a dairy bull from the same cow – equivalent to 2.28p/litre*.

Better breeding can add an average of £45 to the value of a beef calf – equivalent to 0.57p/litre*.

Sexed semen can boost calf returns even further. If fewer cows need to be served to conventional dairy semen, more beef calves can be produced.

Breeding a calf that is born easily minimises the costs of a difficult calving and subsequent poor cow fertility. Ensuring a calf is born on time will see the dam return to the milking herd without delay. Both these traits can be selected for when looking at a sire's EBVs and will vary between sires in any one breed.

Recording the accurate ID of the calf's sire on its passport can add value to the calf and is a requirement of some supply chains.

Cull cows

Marketing cull cows at the correct level of fatness into the most appropriate market can increase returns by £30/head – equivalent to 0.1p/litre.

Fitting beef into the dairy herd

When planning mating strategies, dairy producers can select their highest genetic merit animals and use sexed semen to breed their herd replacements. This allows other cattle with lower genetic merit to be bred using semen from beef sires. Investing in high genetic merit beef bulls will make a significant difference to the value of the calves produced and their lifetime performance.

Dairy producers that milk record are able to run a herd genetic report at no charge. This, along side genomic testing, enables lactating cows and maiden heifers to be ranked in order of genetic merit. Ranking animals based on genetic merit enables producers to select their best animals for breeding replacements and indicates which members of the herd will be best served with a beef sire.

Calculating herd replacement rates enables producers to plan how many replacement dairy females are needed and how many animals can be bred to produce beef-cross calves.

*Improved return for an individual cow with an average 365-day lactation of 7,912 litres. Improvement on a herd basis will depend on the system.

Use of sexed semen

Some dairy producers have found sexed semen highly successful and use it routinely to concentrate their replacement heifer breeding on fewer, better cows. Success relies on achieving good conception rates.

Sexed semen is likely to prove most valuable where:

- **A significant proportion of replacements are to be bred from maiden heifers**
- **The herd has high levels of fertility**
- **Semen is thawed, handled and inseminated with sufficient care and attention**

Sexed semen is not recommended for use with cows experiencing retained cleansings, mastitis, lameness or other health problems.

For more information on planning dairy herd mating strategies, herd genetic reports, sexed semen use and other reproductive technologies, visit **dairy.ahdb.org.uk**

Breeding potential

Dairy and beef industries have similar systems for evaluating the breeding potential of sires. This helps select the right sire for a particular herd, rather than simply relying on visual assessment.

EBVs provide information about the potential performance, ease of calving and gestation length of a beef bull's calves.

Selecting sires using EBVs will help produce the type of cattle the market requires cost-effectively – whether selling calves, stores or finished cattle.

Calves sired by a bull with high EBVs for carcase traits grow faster, with better muscling and less fat than their lower EBV counterparts. In addition, a bull with superior EBVs for calving traits and gestation length, is likely to reduce calving difficulties, delivering huge benefits for cow, calf and producer.

Genetic information available when selecting dairy and beef sires

Dairy	**Beef**
Predicted Transmitting Ability (PTA)	**Estimated Breeding Values (EBVs)**

Ranks cattle within breed for genetic merit of a specific trait.

Selection Indexes eg	**Selection Indexes eg**
Profitable Life Index (£PLI)	Beef Value
Spring Calving Index (£SCI)	Calving Value
	Terminal Sire Index
	Self Replacing Index

Helps producers progress towards a breeding objective by selecting for a balance of different traits.

Reliability	**Accuracy**

The degree of confidence that can be placed on genetic values.

EBVs are available for both stock bulls and AI sires. Ask to see the figures before you buy.

Note: EBVs cannot be compared between breeds.

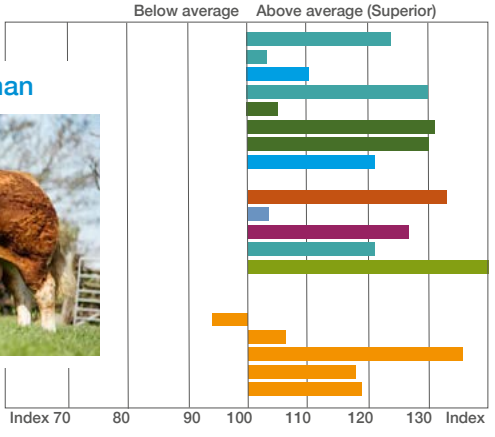
Presentation of EBVs

Estimated Breeding Values are often presented on charts. These charts make it easy to assess a bull's genetic strengths and weaknesses.

Chart presentation may vary depending on whether they are produced by Breedplan or Signet, but the principles are the same.

- Bars that lie to the right of the central line indicate the EBV/index is above breed average (superior). The further the line is to the right, the better
- Similarly, bars to the left of the central line indicate the EBV/index is below the breed average

EBVs for Haltcliffe Iceman



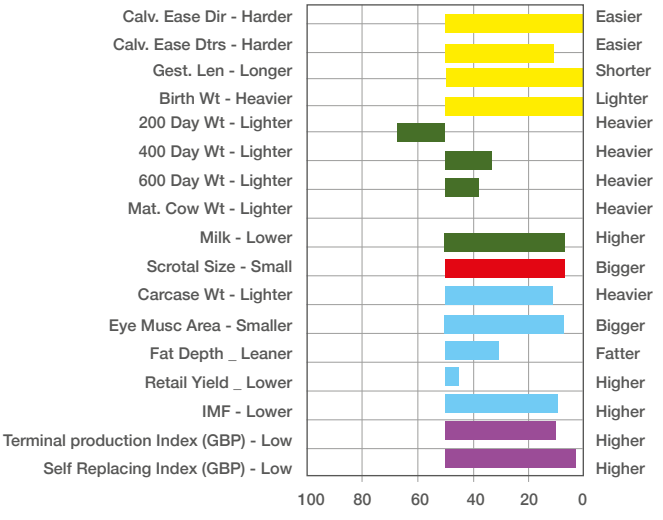
Adjusted weights (kg)	100	200	300	400	500	Scanned
	196	275	534	702	0	NO

Analysis date 01/03/2017	EBV	Acc %
Gest. Length (days)	-2.5	84
Birth weight (kg)	1.6	90
Calving ease (%)	-1.0	82
Mat. Calv. ease (%)	1.7	62
200 day milk (kg)	0	61
200 day growth (kg)	50	89
400 day growth (kg)	91	88
Muscle depth (mm)	5.8	78
Fat depth (mm)	-0.1	63
Scrotal circ (cm)	1.2	78
Docility (%)	3.0	63
Beef value LIM	45	90
Calving value LIM	4	85
Maternal value LIM	42	65

Analysis date 07/03/2107	GEBV	Acc %
Carcase weight (kg)	4.15	72
Age at slaughter (days)	10.37	66
Fillet (kg)	0.14	69
Striploin (kg)	0.70	69
Rump (kg)	0.57	70
Retail value (pts) LIM	34.84	71

Sale Wt(kg)	Withers/ Rump Ht (cm) Scrotal Circ. (cm)

EBVs for Keeldrum Clio



Meeting market needs

EBVs for calving ease, growth and carcase traits must be the focus when buying a beef bull or AI sire.

Calving traits

Check calving ease information for all sires as this is critical. Look for positive calving ease figures and negative figures for birth weight and gestation length.

Choosing a bull with easy calving EBVs can significantly reduce losses from calving difficulties, including the cost of veterinary treatment, poor fertility and lost milk output.

It is possible to choose sires with good calving ease figures and excellent growth and carcase trait EBVs.

Ease of calving is influenced by birth weight, calving ease – direct, maternal calving ease and gestation length.

Birth weight EBV (kg)	Calving ease – direct EBV	Gestation length EBV
Identifies bulls that will produce smaller calves at birth.	Identifies bulls whose progeny will be born without assistance.	Identifies bulls whose calves are born without extended gestation length.
Example A bull with an EBV of -4kg is estimated to produce calves with birth weights 2kg lighter than a bull with an EBV of 0.	**Example** A bull with an EBV of 6 is estimated to produce 3% more unassisted calvings compared to a bull with an EBV of 0.	**Example** A bull with an EBV of -6 will produce calves with gestation lengths 3 days shorter than a bull with an EBV of 0.

Growth and carcase traits

When breeding beef calves from the dairy herd or buying animals to finish, it is important to think about the growth rates and carcase traits needed so that the finished cattle can hit market specification and produce the best returns.

200 or 400 day growth EBVs (kg)	Muscle depth/area EBV (mm/cm^2)	Fat depth EBV (mm)
Indicates breeding potential for growth to 200 days of age or 400 days of age.	Assesses muscle depth/area across the loin.	Assesses fat depth across the loin.
Example A bull with an EBV of +22kg is estimated to produce calves 11kg heavier at 200 or 400 days than a bull with an EBV of 0.	**Example** A bull with an EBV of +6mm is estimated to produce calves with 3mm more muscle across the loin than those of a bull with an EBV of 0.	**Example** A bull with an EBV of -2mm is estimated to produce calves with 1mm less fat across the loin, than those of a bull with a 0 EBV.

Beware: Do not select on growth rate EBVs alone. Always consider calving ease and gestation length EBVs when selecting a beef sire.

More information on choosing a beef sire can be found in Beef BRP Manual 1 **Choosing bulls to breed for Better Returns.**

Investing in the right genetics

Many dairy producers run a beef sweeper bull with their herd. However, this can be counterproductive in terms of the quality of calves produced.

Unless investment is made in a stock bull with superior EBVs, his offspring will often have lower growth rates, poorer carcase quality and more difficult calvings than an AI sire. Investment in quality genetics can return up to £42/calf.

It is difficult to identify bulls with superior breeding potential for growth and carcase traits by eye alone and impossible to assess calving ease traits. Yet there are real genetic differences between bulls.

Case study: Harper Adams University, Aberdeen Angus bull trial

Two Aberdeen Angus bulls, one with an EBV in the top 10% of the breed and one with EBV's below breed average were mated to dairy cows. Their progeny were reared on a cereal beef diet.

The calves by the high genetic merit bull consistently outperformed those by the lower genetic bull, generating an extra £42/calf.

Table 1. Comparsion data between bulls in trial

Terminal sire index	Progeny by sire with EBVs in top 10% of breed	Progeny by sire with below average EBVs
Average daily liveweight gain (DLWG) (kg)	1.30	1.24
Average carcase weight (kg)	293	278
Average carcase conformation (scores)	3.08	2.77
Average fat class (scores)	3.54	3.69
Average carcase value	£979	£918
Net benefit after accounting for difference in days to slaughter	£42	

Start with the right calf

Lifetime productivity of a calf relies on it getting a good start in the early hours and days following birth. Calves for beef production need colostrum in the same way that dairy heifer calves do. Their management in the first few days of life will have a big impact on lifetime performance.

Compared to calves that receive sufficient colostrum, those that do not have been shown to:

- Need more antibiotic treatments pre-weaning
- Have reduced liveweight gain
- Reach slaughter weight later

Remember the three Qs of colostrum

Quantity – three litres within two hours of birth, followed by a second similar-sized feed within six to 12 hours of birth

Quality – contains at least 50g/litre of immunoglobulin IgG. This can be measured using a colostometer or refractometer which are relatively inexpensive

Quickly – within two hours of birth. Absorption of immunoglobulins progressively declines after birth

Dairy farmers should aim to produce calves that:

- Have received adequate colostrum at birth
- Are of known disease status
- Grow well – at least 50kg at two weeks old, 45kg if native breed
- Are healthy with a dry navel
- Are alert and bright-eyed
- Show reasonable conformation

Rearers should also focus on these areas when buying calves and be prepared to pay more for the right calves, which will perform better throughout their lives.

Where possible rearers should ask the dairy farmer about:

- The management of newborn beef calves. Is colostrum intake a priority?
- The sires used to produce beef calves. In particular the breed and bull identification so that checks can be made on genetic merit
- The type of dairy cows in the herd, to understand the dam's influence on frame size and conformation
- The health status of the herd, eg BVD, Johnes, IBR, TB, to understand the health risks associated with the calves

Avoid buying calves that have:

- Diarrhoea
- Discharge from their mouth, nose or eyes
- A wet or thickened navel
- Trouble breathing
- A listless appearance or dull coat

Weight for age

Liveweight alone is not a reliable indicator of future performance, but 'weight for age' is. The heavier the calf at purchase relative to its age, the healthier it is likely to be and the better it will perform.

Optimising calf health

To ensure a healthy calf, the aim is to minimise its exposure to disease and maximise its defence against it.

Minimise buying in disease	Minimise spreading disease on farm
Source calves from a high health status dairy herd	Run an 'all in-all out' rearing system so that calves of different ages are not mixed together or share the same air space
Source calves that have had good colostrum intake during the first hours of life	Have dedicated sheds for calves away from other livestock
Check calf before purchase for signs of ill health and test to identify any Persistently Infected (PI) BVD animals – which should not be purchased	Wash feeding equipment and disinfect housing regularly. Keep calves well bedded with good ventilation but no draughts

Disease testing

Testing calves for BVD is a good investment, as buyers are often willing to pay a premium for animals that are known not to be persistently infected (PI). PIs will have reduced growth rates and often die in their first year. The incidence of pneumonia can increase by 43% in healthy cattle sharing airspace with a PI.

Persistently infected calves should be culled immediately because they will shed high quantities of BVD virus into their environment for life. For more information on BVD and options for testing visit **www.bvdfree.org.uk**

Health planning

Take a proactive approach to managing calf health by working with a vet to implement a health plan for cattle. This should include a vaccination programme and steps to minimise buying-in disease and the spread of health problems, should they arise.

Where treatments are required, being able to identify problems early is vital to improve the success rate of treatment and minimise the quantity of medicines used.

For cattle that graze, parasite control is important. Consider gut and lung worms and also liver fluke and ectoparasites, such as lice and mites. Further information on parasite control in cattle can be found at **www.cattleparasites.org.uk**

Feedback from abattoirs can provide valuable information about herd health. Check for results, which can indicate signs of liver fluke infection, pneumonia or other health issues seen at slaughter. Further information is available in the **Abattoir post-mortem conditions guide** at **beefandlamb.ahdb.org.uk**

How a PI calf is created

BVD in early pregnancy
Infection from 0-110 days of gestation

Cow and calf infected
- Buyer beware
- Hidden dangers
- Calf is only tested once born

Only dam becomes immune and becomes a Trojan Cow
Take care when buying in-calf animals as the foetus cannot be tested

Calf born persistently infected (PI)

Early life nutrition

The rearing phase is vitally important in determining how well a calf will perform in later life. Nutrition fuels growth, immunity and rumen development during this stage.

Milk replacers

Milk replacers are the mainstay of most calf rearing enterprises. There are many different products and feeding systems so it is important to choose one that will deliver growth rates appropriate to the production system and then maintain consistency of product fed.

Calves should grow at least 0.8kg/day between birth and weaning and should be at least 80kg at weaning. Milk replacer should contain 20–26% crude protein (CP) and 18–20% fat to achieve optimal growth rate in early life.

It is generally recognised that feeding rates for young calves have historically been too low. Current advice for most beef situations is to feed a minimum of 750g/day, which can be achieved by feeding different concentrations as shown in Table 2. Increasing the feeding rate increases growth rates. However, the amount of calf starter feed being eaten at the same time must also be considered.

Impact of environment

Calves less than three weeks old are most vulnerable to changes in temperature. They need extra feed and warmth if the temperature falls below 15°C to maintain performance.

Calves older than three weeks are more robust, but still require extra feed if the temperature falls below 10°C.

Mixing at high concentrations is more likely to result in a nutritional scour and reduced absorption of nutrients. Always consult the manufacturer before mixing at concentrations other than those recommended on the instructions.

Additional milk powder is best provided by feeding more litres of milk per day, preferably in an extra feed. Any changes to feeding should be made gradually. It is better to apply a higher feeding rate across a whole rearing period than change feeding levels part way through.

It is vitally important that calves have access to clean, fresh water all the time, even when they are drinking milk.

For more detailed information on rearing beef cross calves see Beef BRP manual 12 **Better Returns from calf rearing**.

Table 2. Daily quantity of milk replacer supplied per calf (g)

Mixing rate (g/l)	Litres fed/day				
	4	5	6	7	8
150	600	750	900	1,050	1,200
140	560	700	840	980	1,120
130	520	650	780	910	1,040
125	500	625	750	875	1,000

Weaning

The newborn calf is a single-stomached (monogastric) animal, only using its abomasum for digestion in the first few weeks of life.

Development of a healthy rumen is a vital step in the calf rearing process. It is driven by a number of factors related to the nutritional management of the calf in its early life.

Drivers of rumen development

- **Clean fresh water supply**
- **Good quality starter feed**
- **Clean fresh straw**

All the above should be available from birth.

Rumen development of calves aged six weeks

Digestion of feeds rich in starch play an important role in rumen development. Calves should be managed to encourage intake of starter feeds as soon as possible. Figure C clearly shows the darker coloration and the more developed rumen papillae of calves fed a grain based starter feed.

A - Milk only diet
B - Milk and hay
C - Milk and grain-based starter feed

Calf starter feeds

Starter feeds are designed to promote rumen development, transitioning the calf from a diet based on milk, to one based solely on forages and concentrates.

A good calf starter feed should contain 18% CP fresh weight and a minimum of 12MJ ME/kg DM. To achieve maximum intake it should be fresh and free from dust and mould and offered in clean troughs.

Fresh straw should also be supplied in racks. It is important to limit intake of good quality hay or other forages before weaning, as this can reduce starter intake and lead to calves becoming pot-bellied.

Weaning

Good management at weaning is important for maintaining good growth rates and minimising disease.

A group of calves can be considered ready to wean when they are routinely consuming 1.5kg/head of high-quality starter feed a day.

Post-weaning calves should be fed straw as the forage component in the ration and transitioned slowly to silage when they are around five to six months of age.

Growth targets

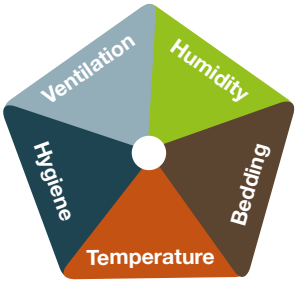
>0.8kg/day from birth to weaning
>1.1kg/day from weaning to end of rearing

The efficiency of converting feed to weight gain reduces as cattle age. Exploit this by feeding calves to grow at fast rates, improving health and lifetime performance at the same time.

Calf housing and hygiene

Good housing design supports good health and welfare, and is absolutely critical for maintaining the health and performance of calves.

Five crucial factors affect the calf's environment:



Ventilation

A constant supply of fresh air is essential in calf housing to prevent respiratory and other diseases. Stagnant air contaminated with dust, moisture, ammonia and viruses, which can cause pneumonia, must be removed and replaced by fresh air.

Cobwebs in buildings and condensation on the underside of roofing are signs of poor ventilation.

While fresh air is essential, draughts at calf level must be avoided. The use of large volume, general-purpose buildings for calves is not recommended. Big buildings will only provide ambient temperature and youngstock risk suffering from cold stress.

Mechanical ventilation is valuable where the layout of farm buildings leaves areas that cannot be ventilated naturally. These areas can be improved by either blowing air in (positive pressure ventilation) or sucking air out (negative pressure ventilation). In either case it is essential to provide adequate inlet and outlet areas.

Calf hutches are a good way to house calves individually or in small groups. They should be situated on free-draining concrete or on a porous base, such as chalk, ensuring that any effluent goes to a suitable site for disposal. Ideally the hutches should be moved after each batch of calves to minimise disease risk and properly cleaned.

Bedding

It is important to provide sufficient clean, dry bedding to reduce contact between the calf and the floor and any soiled straw. Bedding is also important for thermal comfort. The calf's legs should not be visible when it is lying down.

For more detailed information on rearing calves see BRP Beef Manual 12 **Better Returns from calf rearing**.

Transition management

Transition management refers to a time when the life of a beef animal changes significantly. This usually occurs when it moves between farms or when its diet changes, eg going from a growing to a finishing ration.

If not managed well, this can result in a period of reduced growth rate, as the cattle adapt to their new environment and their rumens adjust to a new feeding regime. Planning is vital to reduce any setbacks.

When changing to finishing rations, which generally contain less forage and more supplementary feeds, there is likely to be increased rumen acidity and therefore potential for health problems.

The new ration should be introduced gradually, with increasing amounts of the new ration supplied each day over a period of around two weeks, while the amount of original ration is reduced at the same time. The length of the changeover period depends on the extent of the difference between the rations (Figure 1).

Where large amounts of concentrates are being introduced, the time period should be extended to make the change slowly. If feeding from a trough, the ration should be fed in two meals per day of no more than 2kg per feed, then three meals per day, increasing amounts until the cattle do not clear up all the feed. Then they can be fed from ad-lib hoppers.

Fresh, clean straw should be provided in racks during the transition to ad-lib cereal feeding when other forages are reduced, to stimulate rumen function.

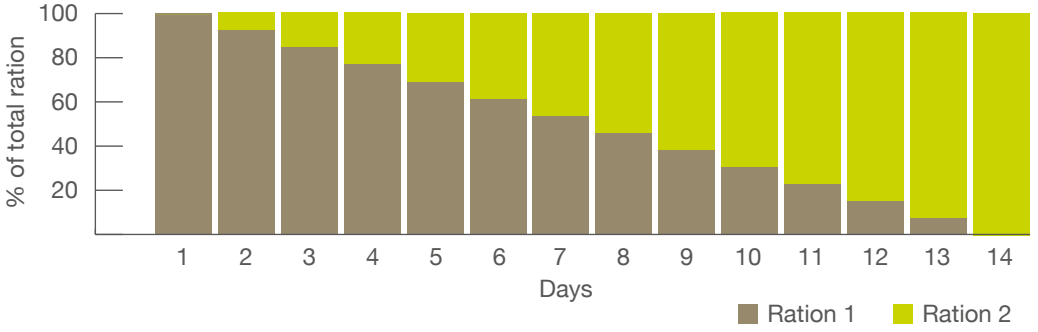
As well as thinking about the transition to a different ration, it is important to minimise stress associated with transport to a new farm, mixing with new cattle and being in different housing.

- Make sure feed and water are easily available to cattle as soon as they arrive, along with a clean lying area
- Give animals a chance to settle and adjust to the new housing and ration before mixing into new groups
- Minimising the difference in liveweight within a pen will help reduce competition, as will avoiding high stocking rates

Look at the cattle

One of the most important ways to assess a ration is to watch the cattle eating it. The majority of cattle not eating or drinking should be ruminating. Also look at the consistency of the dung to check it is not too runny or too dry.

Figure 1. The gradual introduction and withdrawal of different rations



Growing rations

Growing beef cattle must be fed to achieve steady continuous frame growth.

Growing animals have a relatively large appetite relative to their liveweight. They thrive on high levels of good quality forage, as long as there is enough rumen degradable protein to fuel microbial activity in the rumen.

Table 3. Ration guidelines for growing cattle

Nutrients in total ration dry matter (DM)	
Dry matter intake (DMI)	~ 2–2.5% liveweight
Target daily liveweight gain (DLWG) kg	0.7–1.2
Metabolisable energy (MJ ME/kg DM)	10.5–11.5
Crude protein (CP) %	14–16
Neutral detergent fibre (NDF) %	>40
Starch and sugar %	<20

The duration of the growing phase depends on the type of cattle being fed and the carcase specification of the target market. Some markets require a minimum time period at grass.

Where maximum carcase weight limits exist, the growing phase can be reduced to ensure cattle are not overweight at slaughter.

Early maturing cattle types, with a small to medium frame size, suit longer growing phases of moderate growth rates, compared to larger continental sired calves that are most efficiently grown in systems that exploit their high potential for lean growth.

Growing rations are usually forage-based, such as grazed grass, silage, whole crop, straw or combinations of these. They can be supplemented at least once a day with dry or moist feeds to add energy, protein, minerals and vitamins.

Grass silage is a common basal forage and its quality will have a major impact on the rate of supplementation required and cost of production.

Table 4. Impact of silage quality on concentrate feed levels, assuming 400kg continental steer gaining 1kg LW/day

Grass silage quality (MJ ME/kg DM) (All 30% DM)	Concentrates required to meet target performance (kg/head/day)	Cost per kg gain (£)
Poor (9.5)	5.5	1.52
Moderate (10.5)	4.2	1.36
Excellent (11.5)	1.5	1.11

Analysing silage early will ensure rations are formulated correctly.

More information on making grass silage and interpreting forage analysis results can be found in Beef and Sheep BRP Manual 5 **Making grass silage for Better Returns**.

Target growth rates will depend on the production system. Where cattle are going out to grass the following spring, it is advisable to reduce the amount of concentrates fed for six to eight weeks before turnout, with a period of four weeks when no concentrates are fed, to pre-condition the cattle to a grazed grass diet.

Weigh cattle at key points to check they are on track to meet growth targets

For more detailed information see Beef BRP Manual 7 **Feeding growing and finishing cattle for Better Returns**.

Finishing rations

Feeding finishing cattle relies on a short period of maximum liveweight gain to ensure sufficient lean and fat tissue deposition.

Doing this efficiently relies on maintaining high intakes and fast liveweight gains and sending cattle to slaughter as soon as they meet target specification.

The switch from growing to finishing ration usually happens to facilitate the final 100–140kg of liveweight gain. However, this can be reduced, eg to 60kg for early maturing heifers or native type breeds that will finish more quickly.

Finishing diets are energy dense, usually containing feeds rich in starch, to maximise energy intake. Protein requirement of steers and heifers is relatively low at around 12%, whereas bulls may need higher levels of protein. Finishing Holstein bulls show no growth rate response to increasing CP levels above 14% in the DM.

Finishing heifers

Heifers tend to deposit more of their liveweight gain as fat. It is important they are fed to grow sufficient frame size before they move to a finishing ration.

Systems for dairy beef production should aim for slaughter ages below 24 months of age.

Table 5. Elements of a finishing ration

Nutrients in total ration DM	Target	Notes
Dry matter intake (% of liveweight)	1.7–2.2	Aim to maximise intake through feed access, freshness and palatability
Target growth rate (kg)	>1.3	Early maturing breed types may finish on growing diets and be better suited to slower rates of gain to ensure minimum carcase weight is achieved without excessive levels of fat deposition
Metabolisable energy (MJ ME/kg DM)	>12	Energy, particularly from starch, is vital to drive liveweight gain in finishing. Levels should be chosen to match cattle type and market specification
Starch and sugar (%)	>20	Feeds rich in starch and sugars are common components of finishing diets, but need to be managed carefully to avoid digestive upsets. Balance with sources of digestible fibre
Crude protein (CP %)	12–14	Crude protein levels are lower in finishing rations than in growing rations
Long fibre (%)	10–12 in intensive rations	Long fibre is important in intensive rations, where cattle will eat around 12% of DMI as straw (1-1.5kg/day). Best supplied in separate racks or mixed into the complete ration. Avoid relying on bedding to supply adequate long fibre in the diet
Oil (%)	<6	Oil can be a useful rich energy source, but excessive amounts can depress intake

Finishing pure dairy males

Pure dairy male calves are an inevitable outcome of the dairy herd. Sexed semen has the potential to reduce the numbers of these calves. However, if managed well, young males can produce good quality beef suitable for many modern beef markets.

Production systems for these calves range from specialist veal and young beef systems, with cattle finished under 12 months of age, to systems where cattle are slaughtered older either as steers or bulls.

Bulls or steers?

Bulls are best suited to intensive systems where they are finished quickly and slaughtered before 16 months of age. Steers can be finished on the same type of system, or more slowly at between 18 and 24 months of age.

There are advantages and disadvantages of both options. Bulls have superior feed conversion efficiency compared to steers, they also produce leaner carcases with a higher yield of saleable meat in a shorter time than steers. However, producing bull beef is a specialist enterprise and requires suitable housing. Steer production can be more flexible and utilise grazing land and more home-grown forages.

The inclusion of forages can be a useful strategy to reduce costs per head, but it can result in cost per kg gain increasing. Working with a nutritionist will help find the best ration to minimise cost per kg gain, using available resources most efficiently.

Given the inherent poorer conformation of this type of cattle, a finishing period with a fast rate of gain is advisable, not only to ensure the target fat classification is met, but to help conformation classification as well.

Above 550kg liveweight, daily gain of dairy bulls starts to decline and with intake continuing to increase, the decline in efficiency is considerable.

Work in Northern Ireland has shown that Holstein steers consume 9% more feed than other beef-cross dairy breeds and have higher feed costs per kg carcase gain. However, due to their lower calf price, they can produce a similar margin over feed to beef-cross Holstein steers.

Table 6. Dairy bull and steer system targets

System	Continental X dairy bull	Pure dairy	Holstein steer Semi-extensive
Growth rate (kg/d)	>1.4	>1.3	>0.8
Slaughter age (months)	13–14	13–14	18–24
Carcase weight (kg)	330–350	280–320	300–340

Margins in these systems, particularly bull beef systems, are very sensitive to changes in calf price, feed price and carcase price at sale. Preparing a budget and understanding its sensitivity to different market forces is important.

For more information see BRP manual 10 **Better Returns from pure dairy-bred male calves.**

Finishing cull cows

The best potential for profitable finishing of cull cows comes from either:

- Finishing dry cows at grass
- Finishing cows in late lactation and drying them off rapidly before slaughter

Finishing dry cull cows in sheds is very sensitive to feed prices and market prices for cow beef and can be expensive.

Marketing routes

- Sell cull cows immediately if they meet appropriate classification targets – liveweight or deadweight
- Sell cull cows for finishing elsewhere
- Finish on farm

Pointers for finishing cull cows

- Use pregnancy diagnosis to ensure cows are not pregnant
- Ensure medicine withdrawal periods are complied with prior to slaughter
- Drying off must be rapid as weight loss may occur in this period and can affect overall daily liveweight gain
- Only consider finishing those cows that will respond to additional feeding by gaining weight without excessive fat. Some cows will not perform well due to ill health and/or old age
- Young cows offer particular opportunities for profitable weight gain due to higher feed-conversion efficiencies, as do larger-framed thin cows, which can show valuable compensatory growth, as long as they are fit and healthy
- Aim to finish cows in less than three months, with growth rates of at least 0.9kg/day from grass or other feeds
- Cattle failing to perform in the first month should be marketed straight away

Finishing rations

- Rapid finishing relies on high energy rations (+11.5ME MJ/kg DM), containing high quality forages
- Crude protein source is unimportant and diets should contain 11–12% CP/kg DM
- Well managed, grazed grass is likely to be a cost-effective option to finish dairy cows
- Ensiled forages will usually require supplementation to achieve targets
- Rate of liveweight gain declines over longer finishing periods

Selection and marketing

- Select individual animals for slaughter by handling to assess fat levels regularly
- Be sure to comply with farm assurance standards if registered with such a scheme. Non-assured stock will usually sell at a discount
- If selling liveweight discuss specification and demand with auctioneer to optimise returns
- If selling deadweight, understand the minimum and maximum carcase weight specification and carcase classification grid of designated abattoir

Selection for slaughter

Every market has different requirements. Do not produce a batch of finished cattle before finding a market for them. It is far better to identify a potential market or customer first and then produce animals to suit their specific needs.

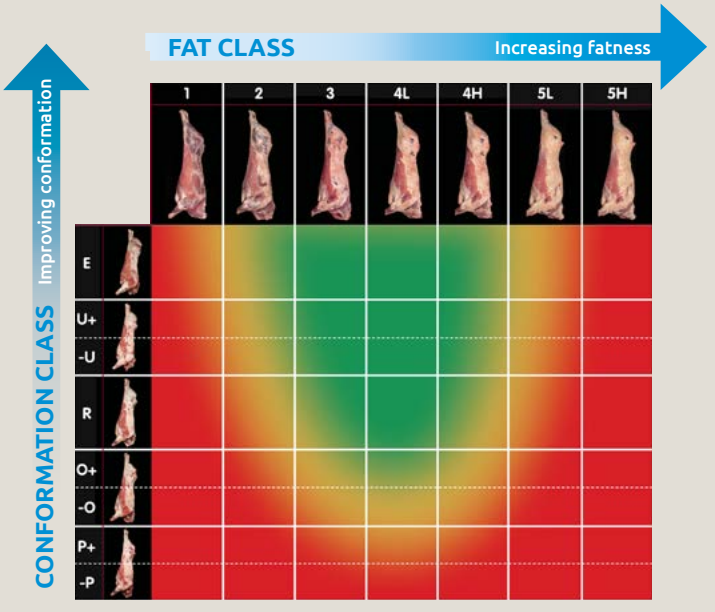
Beef carcase classification

The current grading system for carcases in the UK is based on the EUROP classification for conformation and a numeric assessment for fatness.

Conformation class E represents the best-shaped animal; P represents the poorest. Better conformed carcases will yield a greater proportion of higher value or premium cuts. Fat is classified using the numbers 1, 2, 3, 4 and 5. The higher the number, the higher the visual fat cover on the animal.

To further enhance this classification system, some abattoirs have adopted a 15-point grid in which each conformation and fat class is subdivided into three, low (-), medium (=) and high (+).

Aim for most cattle to fall within the green shaded area, where there is greatest demand and highest prices. Always review abattoir returns to see how heavy carcases were and how they have classified, in case improvements can be made to the management of future batches.



Selecting animals to market

To ensure accurate selection, handling the live animal is essential.

More information on selecting cattle for slaughter can be found in Beef BRP Manual 2 **Marketing prime beef cattle for Better Returns**.

Handle with care

Sensitive handling is vital for animal welfare and avoids any damage that shows up after slaughter. Bruising and abscesses lead to wasteful trimming and even partial rejection of the carcase. This in turn reduces carcase saleability and the amount paid to the producer.

Beef BRP Manuals

Manual 1	Choosing bulls to breed for Better Returns
Manual 2	Marketing prime beef cattle for Better Returns
Manual 3	Improving cattle handling for Better Returns
Manual 4	Beef production from the dairy herd
Manual 5	Feeding suckler cows and calves for Better Returns
Manual 6	Improve beef housing for Better Returns
Manual 7	Feeding growing and finishing cattle for Better Returns
Manual 8	Optimising suckler herd fertility for Better Returns
Manual 9	Controlling worms and liver fluke in cattle for Better Returns
Manual 10	Better Returns from pure dairy-bred male calves
Manual 11	Managing replacement heifers for Better Returns
Manual 12	Better Returns from calf rearing

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