
Improving Suckler Herd Fertility

Make more money
and save labour on
your beef enterprise



Improving suckler herd fertility

Do you want to make more money and save labour on your beef enterprise?

Managing and improving your herd's fertility is one of the easiest ways to increase your beef enterprise margin without making any major structural changes to your business.

This booklet will help you to assess your herd's performance, identify areas for improvement and put some new ideas into practice on your farm.

There are three parts to the booklet:

- 1. Background to the importance of suckler herd fertility**
- 2. Benchmarking herd fertility**
- 3. The five key principles for improving fertility**



Background to the importance of suckler herd fertility

1

Fertility results for Scottish suckler herds

According to QMS Figures the average Scottish suckler herd weans 88 calves for every 100 cows and heifers to the bull. These surveys have found a wide range in performance but the best performers consistently exceed 95 calves reared for every 100 cows mated.

Table 1

	Non LFA to weaning		
	Bottom	Average	Top
Born alive / 100 cows	81	92	98
Reared / 100 cows	79	88	93

The QMS data corresponds well with one survey in south east Scotland where 90% of cows had live calves and the average rearing percentage was 88%. The survey also identified that in a quarter of the herds 95% or more of cows had a live calf, while in the bottom quarter of herds 86% or fewer cows had live calves. For calves weaned the figures were 92% and 84% respectively. This highlights the gap between what many herds achieve and what is achieved at the top end.

Targets for suckler herd fertility

These targets may appear high but some farmers are consistently achieving these levels of performance.

- Calvings per cow and heifer put to the bull – 95%.
- Barren cows – 5% or less.
- Cows calving in first 3 weeks – 65%.
- Bulling periods – 9 weeks for cows and 6 weeks for heifers.
- Calf mortality birth to weaning – <2%.
- Calves reared – 94% (calves reared to cows and heifers bulled).
- Adult cows with difficult calvings <5%.
- Replacement rate <15%.

The financial benefits of better fertility

Table 2 shows the impact of improving the fertility of a herd rearing 88 calves for every 100 cows and heifers put to the bull in two stages through **a)** improvement in rearing percentage, and **b)** improvement in weaning weight.

Table 2	(a)		(a+b)
	Current performance	Improve % reared by 6 calves	Improve weaning wt by 30kg
Calves reared %	88	94	94
Av wt per calf kg	285	285	315
Av calf wt per cow kg*	251	268	296
Average price p/kg	1.25	1.25	1.25
Output per cow	£314	£335	£370
Change in output		£21	£56
Change for 100 cow herd		£2,138	£5,662
100 cow herd over 10 years		£21,375	£56,625

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

Improving percentage reared

Weaning another 6 calves increases average calf weight reared to 268kg per cow and heifer to the bull, an improvement of 17kg. Calf output per cow rises to £335, an improvement of £21 per cow or £2,138 for the 100 cow herd.

Improving average weaning weight

The most effective way to increase weaning weight is to tighten up the calving pattern. A calf born in the first 3 weeks of the calving period will be heavier at weaning than one born 6 weeks into the calving period. Moving from having an average calving pattern (Figure 1) to a tight calving pattern where calves born in the 1st, 2nd, 3rd and 4th three week periods are 65%, 25%, 7% and 3% respectively will increase average weaning weight by 30kg. This extra 30kg gives average calf output per cow of 296kg per cow, a financial gain of £35 per cow.

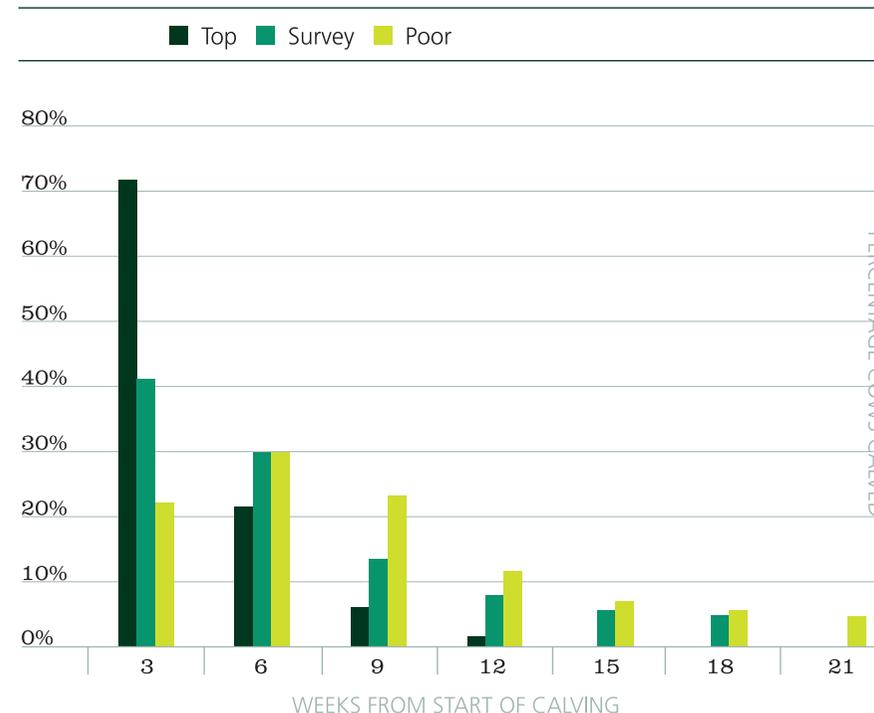
The total net gain is now £56 per cow better than current performance, or £5,662 per year for the 100 cow herd - a significant increase in profit.

Calving spread and the benefits of compact calving

Typical calving patterns

Results for recent SAC surveys on calving spread are shown in Figure 1. Calvings are banded into three week periods from the start of calving, which is defined as 285 days after the day the bull went in. All cows calving before this date are included in the first three weeks. Survey average for spring calvers is compared with the best and poorest herds.

Figure 1 Survey of Calving Spread from 30 Spring Calving Suckler Herds. Source SAC



The Scottish survey shows that only 43% of cows calved in the first three weeks of calving, 73% calved within 6 weeks, with a long tail through to week 18.

The top herd exceeded target with a commendable 71% of calves born in the first 3 week period, and calving was almost finished within 6 weeks. This herd is featured in case study 1.

The poorest herd showed a very flat calving pattern with only 23% of calves born in the first 3 weeks. Calvings were still occurring in week 21, long after the earliest calvers were back with the bull.

Case study 1 **Good fertility is achievable**
 Rob & Kath Livesey, The Firth, Lilliesleaf, Borders

Borders farmers Rob and Kath Livesey run a herd of 80 Saler cows, bred pure. In their 3 years as Monitor Farmers they twice achieved 100% cows and heifers PD'd in calf. They regularly achieve 70% cows calving in the first 3 weeks of the calving period, and over 90% inside 6 weeks.

How did they do it? A lot is down to good management but another factor is having a maternal cow type, in their case the Saler. Borders Monitor Farm group visited The Firth 18 times in a 3 year period and were impressed by the cows fertility, calving ease, milkiness (which allowed calf growth rates of 1.1kg/day with minimal creep feed), and their ability to gain condition at grass. Compact calving allows a large proportion of heifers to achieve target bulling weight of 420kg at 14-15 months old. Breeding sales are the priority at The Firth, and the availability of well grown calves allows the Liveseys to bull extra heifers for eventual sale with calves at foot.

According to Rob: "I get great satisfaction from running such an easily managed herd. I have less to worry about because the cows can pretty well look after themselves and we definitely save labour by having compact and even groups of cattle."

Other traditional, or more accurately maternal breeds, achieve similar results. The key maternal characteristics are early sexual maturity, good fleshing ability, milkiness, longevity and easy calving. Introduction of new maternal EBV indices now makes their identification across all breeds easier.



Compact Calving Pays

Assumptions Calving 15th March Birth Weight – 40kg
 Weaning 1st November Daily LWG to weaning – 1.1kg/day

3 Week Calving Periods	Age at Weaning days	Weaning wt kg	90% calved
1st	221	283	
2nd	200	260	← Top calving pattern
3rd	179	237	
4th	158	214	
5th	137	191	← Poor calving pattern
6th	116	168	

Advantages of Compact Calving

Labour

- Less time supervising calvings.
- Fewer late calving cows reduces risk of more difficult calvings.
- Management operations on bigger batches.

Disease

- Reduces risk of disease spread from older to more vulnerable younger calves.
- Herd fertility.
- More cows bulling at one time makes cows show heat behaviour more strongly.

Weaning weight

- Calves born earlier are heavier at weaning than calves born later.

Marketing

- Compact calving results in more even batches of store cattle.
- Finishing cattle sold faster if born earlier.

Replacement heifers

- More calves born early increases the pool of heifer calves at suitable weight and maturity for bulling.

Case study 2 Selling even batches of calves
James Osborne, Mains of Balmadies, Forfar

James Osborne runs a herd of 230 spring calving suckler cows, managed by his stockman Gordon Smith. Limousin and Belgian Blue cross cows are mated to mainly Limousin and one Belgian Blue bull with calving starting on 3rd March. Results for the 2006 calving were:

- Cows in calf – 95%, heifers in calf – 100%
- Cows calving in first 3 weeks – 55%, second 3 weeks – 29%, total for first 6 weeks – 84%

Presenting even batches of quality cattle has paid off when the cattle are sold store as yearlings at Forfar mart. Gordon Smith comments: “Calves are only sold on two days each year, so having level cattle helps us to present them in larger batches in the ring, which is what the buyers are looking for. Tight calving and larger batches also means less time spent on routine jobs. We hope to further tighten the calving in the next two years.”



Understanding the oestrous cycle

Cows undergo a period of recovery after calving before normal fertility is regained. The uterus recovers from being stretched by a calf, the membranes and protective fluids. This takes around 40 days or substantially longer if there were calving difficulties or uterine infections.

Ovaries regain normal cyclicity after variable periods related to the body condition and energy plane of the cows. Cows in poor body condition at calving, those with a large growth requirement (first calvers) or seasons of poor grass growth are causes of delayed return to oestrus and poorer herd fertility. The target is to ensure that most cows are bulling by 50 to 60 days after calving.

Delays in a normal return to fertility are often caused by calving difficulties and poor nutrition.

Figure 2 Number of days available to achieve three to four mating opportunities for cows calving in different three week periods of the calving season.

Calving Season (wks)			Mating Season (wks)			
3	6	9	3	3	6	9
Cows calving in first three weeks have on average 73 days to resume cyclicity.			A mating season of 9 weeks allows cows that have started cycling by the start of the breeding season three or four opportunities to be mated.			
Cows calving in second three weeks have on average 52 days to resume cyclicity.						
Cows calving in third three weeks have on average 31 days to resume cyclicity.						

Benchmarking herd fertility



Few farmers can readily provide herd fertility information, probably due to the lack of consistent guidelines and an easy calculation method. We have devised a format to overcome this. It uses data that every farmer has readily available and it produces clear outputs that can be used by a farmer, vet or consultant to identify what can be done to improve performance.

Measurements from bulling to weaning are in three categories:

- Per cow or heifer put to the bull,
- Per cow or heifer calving,
- Per calf born alive.

Then herds can be split into cows and heifers, to better identify the cause of the problems. Herds calving in different periods need to be looked at separately. Table 3 shows a cut-down version of a report, with the herds figures compared to target. Cow and heifer data is combined in this instance.

Comment and further action required

The headline analysis of the accompanying set of figures is that herd fertility was slightly below the target, but the percentage of calves weaned was well below target.

There were 6.7% barren cows and heifers. The first step is to look at the age of these animals, when they calved in the previous calving period and whether they suffered a bad calving; e.g. barren cows may be made up of mainly older cows in which case culling policy needs to be reviewed. If younger cows, second and third calvers predominate, then heifer and young cow management should be reviewed.

Percentage of cows calving in each 3 week band is similar to the survey data, with a protracted calving, spread over 15 weeks. Each bulling group's calving performance should be analysed to pick up any bull fertility problems. Late calvers can either be sold with calves at foot or culled. Bulling periods can be tightened by a week each year to eventually reach the 9 week target.

Adjustments are made for live twins and calf losses are recorded. Calf mortality is higher than target at 5.4%. The relatively high numbers in the first 48 hrs of life indicate problems associated with calving. Losses from diseases such as calf scour tend to kick in after this. The bulls calving related EBVs and cow management around calving should also be reviewed.

Table 3 Fertility benchmarking – an example

Spring Calvers 2005 – Per cow/heifer mated

	Number	Combined %	Target %
Cows/heifers to bull	120		
Cows/heifers calving	110	91.7%	95%
Cows/heifers barren	8	6.7%	5%
Cows/heifers aborting	1	0.8%	
Cows/heifers mortality (mate-calv)	1	0.8%	
Cows in calf but culled	0	0.0%	
Calves weaned	106	88.3%	94%

Per cow/heifer calving

	Number	%	%
Cows/heifers calving 1st cycle	49	44.5%	65%
Cows/heifers calving 2nd cycle	35	31.8%	25%
Cows/heifers calving 3rd cycle	14	12.7%	7%
Cows/heifers calving 4th cycle	7	6.4%	3%
Cows/heifers calving 5th cycle	5	4.5%	
Cows/heifers calving later	0	0.0%	
Total calving	110		

Per calf born alive

	Number	%	%
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) combined	2	1.8%	
Calves weaned	106	94.6%	96%

The five key principles for improving fertility

3

- Management of bulling heifers
- Bulls – soundness and fertility
- Managing cow condition and nutrition
- Avoiding difficult calvings
- Maintaining herd health

3.1 Management of bulling heifers

Key points

- Ensure that heifers reach target weights for bulling.
- Sexual maturity is related to weight rather than age.
- 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.
- Tight heifer mating will lead to compact calving as cows.
- Give preferential treatment to first and second calvers.

Selecting replacement heifers

Breeding or selecting your replacement heifers is the most important decision you will have to make. These provide half of the calves' genetics and their type and management will have a big influence on fertility.

Breed replacement heifers from bulls with good maternal EBVs. These are available in two formats – ABRI Breedplan and Signet/BASCO. Key maternal EBVs are listed below.

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	



Target weights for bulling heifers

Getting heifers to start cycling at the start of the mating period should not be a problem, whether calving at 2 years of age or older, provided that the animals reach target bulling weight. Heifers that fail to hold to the bull after a six week mating period are less fertile than their peers and are more likely to slip further in future breeding seasons.

Target mating weights are 65% of mature weight for bulling heifers, 85% for the second mating and 95% for the third.

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

Mature weight is the weight of cows that have stopped growing, usually around 5-6 years of age. This varies across breeds and within breeds depending on the replacement heifers' genetics. The best way to establish mature weight is to weigh some of your cows!

Heifers below target bulling weight, might get in calf easily at first mating but will struggle to hold to the bull after first or second calves because they need to raise a calf, grow frame, and maintain body condition. Those that are under target weight at bulling often fail to hit target condition score for mating when suckling their first or second calf. The consequence is reduced fertility.

- Heifers need to grow at an average liveweight gain of 0.85 – 1.0kg/day from birth to hit these targets.
- First and second calvers need preferential treatment both at grass and when housed, in order to hit bulling targets.
- The cow is programmed to look after its calf as its first priority, and will sacrifice its own body condition – lean cows often prove to be barren cows.

Heifer breeding guidelines

Natural service

- use an easy calving bull (a bull with good calving ease EBVs).
- bull for a 6 week period.
- tight heifer mating = tight calvings thereafter.

AI

- Two turns of AI.
- Synchronisation can help tighten up the heifer calving particularly for herds breeding their own replacements at two years of age.

Replacements calving at over 2 years of age can be mated 3 weeks before main cow herd because first calvers take 20 days longer than older cows on average to return to oestrus. Replacements calving at around 2 years of age should be bulled at the same time as the rest of the herd.



3.2 Bulls – soundness and fertility

Key points

- Bulls must be able to maintain body condition, repeatedly mount and serve cows in oestrus, place fertile semen in cows for a 9 week breeding season and have a long working life in the herd.
 - The bull must have good libido.
 - Bull selection must be focussed on desired EBVs, scrotal circumference, and the physical attributes to allow successful mating.
 - In excess of one quarter of all working bulls are subfertile or infertile.
 - Annual pre-breeding checks allow the subfertile bulls to be identified and excluded from the bull stud.
 - Bulls that have passed the breeding soundness examination can run with 50 cows for 9 weeks and achieve the 95% conception target.
-



Selection criteria for the purchase of young bulls

- The EBVs you require for your system.
- Good conformation with sound legs and feet at sale.
- Scrotal circumference should exceed 31 cm at 15 months of age and 34 cm at two years of age. The testicles should be symmetrical within the scrotum and freely moveable.
- Young bulls should not be over fat. Excessive levels of fat indicate that the bull's growth has been forced and such bulls are more likely to suffer from arthritic conditions in the hind legs and back. If bulls are not sound their fertility will be reduced.
- Buy bulls that are free from BVD virus and meet the health profile of your herd. Screen for infectious diseases.

To achieve the performance targets your bulls must get more than 95% of females they are run with pregnant within 9 weeks, and at least 65% of those in the first three weeks of the breeding season. However, studies from around the world have consistently shown that in excess of one quarter of bulls have defects that will prevent them reaching desired performance levels. A recent survey of bull stud examinations carried out in Scotland found that one fifth of all bulls had bone and joint disease that would have hampered their performance. A further one tenth were physically sound, but had sub-standard semen quality.

Annual pre-breeding examinations will identify the bulls that will let you down. Vets can identify bulls that are unsound as well as evaluating the bull's semen quality.

Vets can now use electro-ejaculation to collect a reliable semen sample in safe conditions. Subfertile and potential high performers can be identified and bulling group size adjusted.

A veterinary assessment of libido and ability to mount and serve properly requires a cow in oestrus to be restrained and bulls observed mating. Alternatively stockmen can carefully observe that bulls are showing libido and mating properly in the first week of bulling. Vets can instruct how this observation should be carried out.

Bull examination timetable

Two to three months before mating:	Check that all bulls are physically sound and any feet that require attention are seen to.
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.

Traditionally many farmers have run bulls in mating groups of around 30 cows and rotated bulls after three weeks. This not only under utilises bull power, but movements are unnecessary and can be dangerous. The reason given has been to cover for subfertile and infertile bulls.

Case study 3 Testing to Meet Fertility Targets

Graeme Richardson, Thrums Veterinary Group, Kirriemuir

Pre-breeding soundness examinations are a growth area for Graeme. These range from annual tests on big bull studs, where under performance might go unnoticed, to suspect bulls, older bulls, newly purchased bulls and sometimes pre-purchase tests.

The objective is to identify the bulls that pass all the tests and are therefore able to perform to a level that will allow the fertility targets to be met. This information allows you, with the help of your veterinary surgeon, to use your bulls to best advantage.

In one case Graeme examined 2 bulls, both of which passed the physical and semen evaluation tests. When one bull broke its leg, a decision was taken to run the other, with all 58 cows. This decision was made with confidence because of the information provided by the breeding soundness examination. The bull successfully mated 57 of the 58 cows in a 10 week period.



3.3 Managing cow condition and nutrition

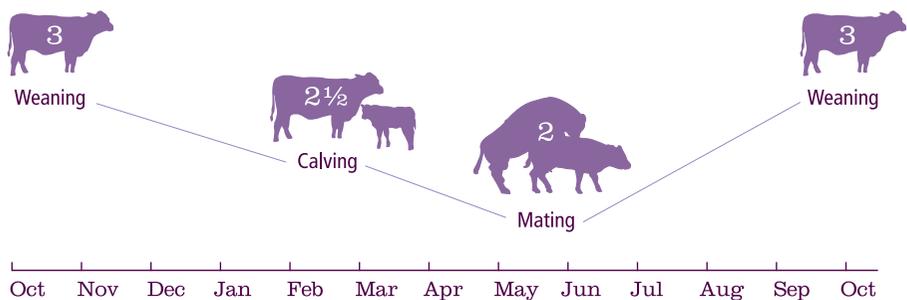
Key Points

- Poor body condition is one of the major causes of poor fertility.
- Manage cows to achieve target body condition scores at calving.
- Give thin cows and first calvers preferential treatment.
- Review rations and forage quality each year.
- Mineral deficiencies are an unusual cause of infertility, but specific supplementation is required in certain areas.

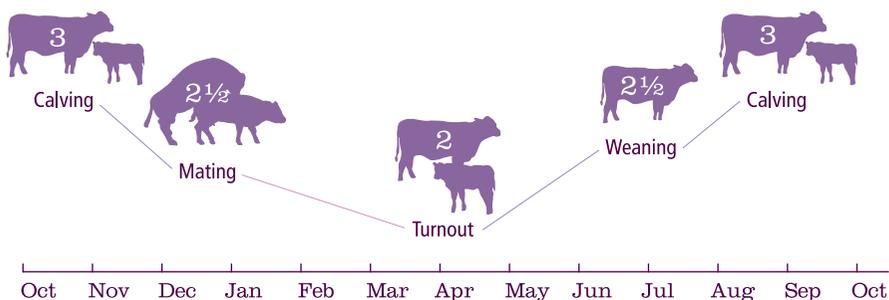
Cow condition must be managed on a year round basis to achieve target condition scores. Condition scoring cannot be done accurately by eye, and cows should be handled in the race using the 1-5 scoring system.

Target calving condition scores are 2.5 and 3.0 for spring and autumn calving cows respectively.

Spring Calving



Autumn Calving



Use a nutritionist or beef consultant to plan winter diets for cows. Group animals according to condition score and feed accordingly, e.g. divide spring calvers into fit, target, and lean groups after weaning. First calved heifers should be housed either separately or with the lean group.

Trace elements and minerals

Diets should be adequately supplied with minerals and vitamins during the mating season. Unless there is a known deficiency it is unlikely that supplementation will be necessary at grass. Your vet or nutritionist can advise on the need for supplementation.

3.4 Avoiding difficult calvings

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.



Some farmers believe that you have to accept a number of difficult calvings, and even caesareans, to rear quality calves with good growth rates and conformation. Difficult calvings are one of the main reasons for poor fertility, they divert labour from more productive tasks and substantially increase the risk of the calf dying in the first week of life. Use of EBVs and some straightforward management practices can help minimise difficult calvings.

Impact of difficult calvings

- Cow – delays return to oestrus, increases prospect of infertility at next mating, spreads the calving pattern and increases the replacement rate.
- Calf – worst case scenario is a dead calf. 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.
- Stockman – supervising every calving, nursing and training weak calves, anti-social hours. Time wasted that would be better employed elsewhere.

Compile a calving difficulty score card.

Simply noting calving ease or difficulty on a scale from 1-5 helps identify problem bulls. L1, 2, 3, 4 and 5 represent a live calf born with no assistance, pull, calving jack, vet, and caesarian respectively. Our target is for less than 5% of assisted calvings.

Case study 4 Improving fertility results by easier calving Douglas Stewart, The Fans, Earlston

Douglas and his father Graham run a herd of 400 cows. They have made a real effort to reduce the impact of difficult calvings by buying Charolais bulls on the basis of calving ease EBVs, and by increasing the proportion of easier calving Aberdeen Angus bulls used on the herd.

Calving assistance has been reduced from 2.5% assisted by the vet in 2000 to 0.5% in 2007. Assistance from the stockman has reduced from 16.5% to 7% in the same period. This has had a marked effect on fertility with barren cows dropping from an average of 12% (2001-2003) to 6% in 2006. This is not entirely down to easier calving, because BVD vaccination and bull semen evaluation has also played a part, but it is a major factor.



Reducing the risk of difficult calvings

- Use EBVs to select bulls for the traits that you require – e.g. calf birth weight, gestation length and calving ease figures for sire (direct calving ease). Avoid bulls with extreme minus calving ease figures. Check gestation length because longer gestation normally leads to increased birth weight which increases the risk of calving difficulty.
- Calving ease figures for cows – e.g. calving ease daughters or maternal calving ease. EBVs are now provided which tell us how easily a bulls' daughters will calve as cows.
- Cow condition and calving. Fitter cows will have more fat around the birth canal, increasing calving difficulty. Late summer and autumn calving cows need to be grazed tightly to controlled grass heights before and during calving if calving difficulty is to be avoided.

3.5 Maintaining herd health

Infectious disease can act to reduce bull fertility, increase abortions and impact on calf mortality and growth rate.

Key points

- Several infectious diseases can impact on productivity year after year.
- BVD, leptospirosis, venereal campylobacter infection and Johne's disease are the most important diseases.
- Poor conception rates; increased abortions and stillbirths; increased calf mortality and increased wastage of breeding animals result from infectious disease.
- Apparently healthy carrier animals are the most common way of introducing these infections to the herd.
- Effective biosecurity systems can keep these diseases out of your herd and prevent the re-introduction of infection once you have eradicated them.
- Herd health planning highlights the risks for your herd and provides a programme to manage these risks.

BVD, leptospirosis and venereal campylobacter infection can all reduce bull fertility and the ability of the cow to conceive. They also increase the losses through death or damage of the developing calf leading to abortions, stillbirths and damaged calves that are more likely to die in the first few weeks of life. Johne's disease will significantly increase the replacement rate.

The on-going annual cost of these diseases can be in the order of £2,000 to £5,000 per year. However in the first year where herds experience a BVD or campylobacter outbreak then the losses can be spectacular, with some as high as £20,000 per year.

Purchase of infected carrier animals is the most common way that these infections arrive in the herd. A risk table for these diseases and replacement strategies is shown below.

Table 4 Risk assessment guidelines for common replacement policies in relation to BVD, leptospirosis, campylobacter and Johne's disease.

■ Negligible ■ Moderate ■ High

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

Accreditation programmes allow the sale of assured breeding replacements. These are standardised programmes and the operators are licensed by the Cattle Health Certification Standards (CHeCS). Individual animals may also be screened immediately before purchase or when in isolation after purchase. Vaccines can also help to control and to minimise the impact of the disease should it be introduced.



Credits

Iain Riddell, Senior Beef and Sheep Consultant, SAC Perth

George Caldwell, Regional Veterinary Manager, SAC St Boswells

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Quality Meat Scotland
Rural Centre, West Mains
Ingliston, Newbridge
Midlothian EH28 8NZ

0131 472 4040

0131 472 4038

www.qmscotland.co.uk

info@qmscotland.co.uk
