Maximising Suckler Cow Profitability Using British Native Breeds

A Nuffield Farming Scholarship Trust Report

by

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The views expressed in this report are entirely my own and do not necessarily represent the views of the Nuffield Farming Scholarships Trust, or my sponsors, or any other sponsoring body.

I really need to thank my wife Eileen and our three daughters Hannah, Lauren and Christina for their support, running the place while I was away, and putting up with the continual “Where’s Daddy?.....in the office!” during the writing of this report.

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Introduction

I farm a 190 ha Lowland Beef and Sheep farm with my wife Eileen and our three daughters, near Stranraer in South West Scotland, 100 miles west of Carlisle. The farm carries 150 suckler cows and 520 ewes. 10 hectares of Spring Barley is grown for home consumption. I use predominantly Hereford Angus crosses, although there remains the legacy of a few misguided experiments in the herd. My excuse for keeping some of them is just to remind me just how bad they are! Charolais bulls are used as a terminal sires with about 60 of the calves sold store at 11 months old and the remainder finished mostly off grass.

I closed the herd two years ago, mainly for biosecurity reasons, and now breed all my own Hereford Angus replacements. The herd became Johnnes accredited at the beginning of 2007.

The ewe flock comprises mostly Scotch Mules, sourced locally from one farm as gimmers, and some home bred Texel crosses. These are all put to either Suffolk or Texel Rams to lamb at the beginning of March. I aim to have all lambs finished off grass by the end of October.

In 2004 I became the third Scottish Monitor Farm, the first to be wholly funded by Quality Meat Scotland.

Executive Summary

If you want to start an argument in a room full of beef farmers all you have to do is ask them what the best beef cow is.

My own experience had left me more and more disappointed with the quality of bought-in replacements. At a farm sale one day, I bought a group of heifers that had caught my eye. These were my first Hereford Angus cross cows. I was intrigued when the vendor told me that this was the type of cow that most of the main beef producing countries in the world use.

The next time I was in a room full of farmers and told them I had bought these heifers and intended crossing them back to a native bull, the response was, “You’re going to do what....?”

Objectives

There are many commercial beef farmers using many different breeding systems in the UK. Some are very successful at what they do and, quite rightly, will continue to use that system. Others however, seem to have reached a crossroads where they are pleased with the calves they are producing, but unsure of cow performance. The top two concerns for most producers seem to be fertility and temperament. With conception rates in dairy herds now estimated to be as low as 40% and most continental breeds having “social issues” many suckled calf producers are looking for an alternative suckler cow.

"Production is Vanity, Profit is Sanity"

In many cases the farmer is focused on production, not profit. This can lead to a situation where suckled calves top the sales every year, but herd performance is poor, with a low calving percentage and high replacement rates.

The majority of the cows used are either from dairy stock or have been home bred using continental bulls. In both cases the genetics used have become extreme and the cow is a by-product of another system, rather than one built for the job.

British beef and especially Scotch beef have excellent product image and quality expectations worldwide. As producers of quality beef we must ensure that these reputations are maintained in the beef that we produce.

The main objective of this study is to provide farmers with the information to allow them to work out a strategy for profitable high quality beef production. This is no mean task, as I know from my own experience as a Monitor Farmer. Without the Single Farm Payment, any enterprise, especially beef production, struggles to make a profit. The latest annual report from Quality Meat Scotland shows that only 3% of the various suckler enterprises surveyed made a positive net margin. If the industry is going to make any money from beef cows it needs to take a good look at its most fundamental resource – the cow. The right cow has to produce one high quality beef calf, each year, at a profit.

I decided to travel to parts of the world with a similar climate to the UK and study their beef production and methods. I visited Argentina, Uruguay and Australia, and tried to stay in the more temperate regions to get the best overall picture of the production systems that were relevant to UK conditions.

Each of these three countries has no subsidy system, little regulatory interference and beef industries that are totally focused on the consumer. Beef consumption per capita is over twice that of the UK in all of these countries. The reason for this could be cultural, price led, or simply that the beef tastes good. It would appear that producers pay more attention to producing a uniform product and giving the consumers exactly what they want.

I soon found that travelling as a Nuffield Scholar opened doors that I did not even realise existed.

Conclusions

All the producers and breeders I met were focussed on profit, not production. The aim was not to sell the most expensive animal at the market, but sell all marketable animals at a profit.

With no subsidies, each of these countries has bred a cow for profit, and developed cows that involve only two breeds - Hereford and Angus are used exclusively. As a result there is a huge gene pool for breeders to choose from.

Subtle differences in size and shape have been used by breeders to adapt the cows to the different climates. Argentinean cows were the smallest, with Australia using the largest. Even the biggest cows were small by UK standards.

The UK beef producer is fixated with the shape of the carcass, South America and Australia focuses on eating quality. In terms of measuring and breeding for eating quality, the UK is 5 –10 years behind Australia.

Traceability in Uruguay is more robust than Argentina, but is still only on a batch basis. None of the countries, including Australia, can trace the animal back to its mother. The UK is probably 2–3 years ahead of these countries in this respect.

There does not seem to be a consumer issue with growth hormones and genetically modified feed in these countries and both are widely used to keep down costs. Farmers are generally held in high esteem by members of the public, not as "subsidy junkies", and are trusted as a result.

Recommendations

To maximise profit, UK cows need to be smaller, eat less, live longer and be more fertile. The main priority of every producer should be a live calf as this is the biggest single factor affecting cow profitability. Difficult calvings will also affect her fertility. Stock bulls should always be selected for good calving ease figures and low birth weights.

Heifers need to enter their productive life as soon as possible, calving as two year olds. To be able to achieve this, producers need to use breeds with early sexual maturity and growth rates that allow the calf to reach 65% of its mature weight at 15 months. First calvers should be 85% of mature weight.

Temperament is a big issue, affecting ease of handling and eating quality. Breeds or bloodlines with temperament problems should not be used in beef production. There are alternatives. Research in Australia has shown that cattle with good temperament have superior daily liveweight gains of up to 0.4kg per day, compared to cattle with "social issues". With labour becoming scarcer on farms this has to be a priority even if just for safety.

With the price of cereals increasing, suckler cow enterprises will need to make more use of forage, both in cow diets and finishing systems, to remain competitive.

British native breed cattle and crosses of British native breed cattle can easily meet these requirements. Using the phenomena of hybrid vigour between two native breeds will further enhance performance. The industry needs a maternal cow.

Breed societies must play their part and ensure that the best genetics for commercial beef production are available to producers. Show cattle should be judged on commercial traits. Maternal lines in bulls need to be promoted for replacement breeding.

The UK beef industry cannot compete in a commodity market with these countries. We must use our full traceability and assurance standards to provide a premium product at a premium price. We need to employ the latest technology to guarantee eating quality and supply markets that want guaranteed eating quality.

The industry needs to emphasise the traceability of UK beef and the fact that no GM feed and growth promoters are used. If farmers would spend as much time looking after the consumer as they do playing the system, image problems would soon disappear.

Beef produced in other countries using methods outlawed in the UK should not be sold in the UK. It ***is*** as simple as that.

Overview of the Scottish Beef Industry

Scotland has some 500,000 beef cows on almost 13,000 holdings producing 180,000 tonnes of beef annually. With almost 30% of the UK herd of breeding cattle, the beef industry is the single most important sector of Scottish agriculture. The UK beef herd, as a whole is the second largest in the EU, just behind France.

Trading restrictions were lifted in May 2006. When I started travelling in October 2006, Scotland had exported some £3 Million worth of beef to the continent. This figure has now exceeded £31 million in the first three months of 2007. Scottish beef, and particularly the Scotch brand, has an excellent reputation for quality worldwide, backed up by a fully integrated assurance programme that guarantees high production standards throughout the entire chain of production and processing; from the farm gate to the dinner plate.

Types of Suckler Cow Used

Breeding policies on farms in Scotland and the rest of the UK have been of the "Heinz method", that is there are at least 57 different types of suckler cow being used. This has actually worked surprisingly well for the last 20 years, with most producers buying a batch of heifers at a market that have been bred from the dairy herd. Eventually crossed with a large terminal sire breed, such as Charolais or Limousin, they are used in the hope that it will stamp their mark and produce an even batch of calves. Other producers have chosen a single breed and kept their herd pure, which allows them to breed their own replacements. In the case of Aberdeen Angus, this gets a premium for the finished steers and heifers. Producers with some sort of breeding replacement strategy would appear to be managing a lot better than those without.

Physical and Financial Performance

In the most recent QMS survey quoted below, herd performance varies greatly in Scotland, with the top producers rearing 14 calves more than the poorest performing producers. There is clearly plenty of scope to increase output at the bottom end of the scale.

	Non LFA to Weaning		
	Bottom	**Average**	**Top**
Born Alive / 100 Cows	81	92	98
Reared / 100 Cows	79	88	93

The following table shows the results from a QMS survey into the financial and physical performance from Scottish suckler herds. The table quoted is for upland suckler herds, but the results are quite similar for the rest of herd types. Of the 98 different suckler enterprises surveyed only 3% were making a positive net margin.

Scottish Upland Suckler Herds

	Bottom Third	**Average**	**Top Third**
Average Herd Size	76	97	103
Gross Output	**284**	**343**	**405**
Variable Costs	220	192	186
Gross Margin	**64**	**151**	**219**
Fixed Costs	304	334	380
Net Margin	**(-) 240**	**(-)183**	**(-) 161**

Source: QMS

According to the QMS survey the top-third producers produced 48kg more calf weight per cow mated than the average and 89kg more than the bottom-third. This was achieved through a combination of:

- Higher calving percentages
- Fewer calf losses
- Better daily liveweight gains
- Production of heavier calves

It illustrates clearly that few suckler cow operations are making any profit without the Single Farm Payment. More worryingly, QMS also reported that 56% of finishing enterprises did not achieve a positive net margin.

Beef production has entered a new era. Decoupling of support and the formation of the Single Farm Payment system is forcing Scottish farmers and indeed farmers across the whole of the UK, to look at production systems from a different angle.

Physical performance can improve profit, but what about quality? Led by consumer perception, the industry's premium product is Specially Selected Aberdeen Angus, commanding a premium of up to 12p/kg deadweight. Each animal has to be from a registered Aberdeen Angus sire, but the breed of the dam is unspecified. This premium is needed as the EUROP grid favours continental type cattle with superior conformation.

Although UK traceability and assurance standards are the highest in the world, imported beef, with practically no standards, is still sold alongside Scottish beef on supermarket shelves. Co-mingling of these different products confuses consumers.

For Scottish and other UK producers to survive in a subsidy free market, production and processing systems from parts of the world with no government support need to be adopted. This should not only include breeds and types of cows, but also the systems that ensure eating quality.

Hereford Cattle on the Pampas

Argentina

In a country with the world's highest consumption of beef at 68kg a year per capita, steak is always on the menus in Buenos Aries. The cities inhabitants appeared fit and healthy with little obesity. This may be attributable to good diet, but with city traffic doing 70mph between the lights, pedestrians need to be quick to get across the street!

The Argentinean diet is a wholesome one, with few processed foods. Meat is eaten at nearly every meal; indeed some meals comprise *only* meat. As a result, most of Argentina's beef production is consumed in Argentina. Only around 10% reaches the export market. With a beef herd totalling 50 million head, Argentina is in the top five beef producing countries in the world, with 3 million tonnes slaughter weight annually, and is the world's third biggest exporter behind Brazil and Australia. EU imports last year totalled 5000 tonnes, down from the 2005 figure of 9080 tonnes.

The Pampas

It is hard to describe the sheer scale of the Pampas. The completely flat region south of Buenos Aries covers some 200,000 square miles. I have been in parts of the world before that were flat, but not on this scale, and there was always some mountain range in the distance. Driving in the middle of the Pampas, the view does not change for the entire journey. Some areas are more fertile than others and cattle are grazed on the poorer soils. Eighty hectares seems to be the average field size with a half hectare block of eucalyptus in one corner to shade animals from the sun.

With the population speaking Spanish and very little English, communication proved to be a bigger obstacle than I had first envisaged, especially when most of my visits were to cattlemen. Eating out on my own became an adventurous culinary experience.

Liniers Cattle Market, Buenos Aries.

The government is trying to implement full cattle traceability by the end of 2007; something that all the farming leaders have agreed is impossible. It still remains a political goal. In my opinion, this will be achieved within the next few years. One of the biggest obstacles is adult illiteracy, that remains at 4% nationally. This is higher in rural areas and in the population involved in beef farming, especially on the larger estancias where the majority of the work is done by gauchos. If the Argentinean government ever gets its act together, this country has a huge potential to produce high quality beef at production costs considerably lower than anywhere in Europe.

Argentina – Main Points

- Mostly Aberdeen Angus breeding for finishing animals led by consumer preference.
- Cows are quite small by UK standards – 450-500 kg at most.
- Most producers will only pay the price of two fat animals for a stock bull. This puts the price of a stock bull at £300.
- The Argentinean climate has two periods during the year when there is no grass. Two months in the winter and two months in the summer when it is too dry. As no conservation of forage takes place the cow has to have enough back fat to take her through both of these periods. Some cattlemen will feed standing wheat or barley over the winter.
- Expected calving percentage with minimal labour input is 85%. Even the biggest estancia I visited with 10,000 cows on 8000 ha was achieving this.
- Some farmers were weaning the calves as young as 2–3 months. As grass disappeared during the dry summer months, cows were kept on bare paddocks, allowing the calves the best grazing. Most felt that feeding a calf with its mother's milk was an expensive way to get liveweight gain. The cow would come into season very quickly when it was weaned as a very effective aid to fertility. Most were weaned at 5–6 months at 120–180 kg.
- Calves are castrated at 5–6 months. No bulls are used in beef production as the consumer does not like the taste.
- After weaning calves are stocked at 750 kg of calf/ha (300 kg/acre) and are expected to do 0.5 kg/day liveweight gain at grass on the Pampas.
- Calves are killed around 19–20 months of age after a 90 day finishing period in a feedlot on maize silage and wheat nuts. The last 2–3 weeks are just on maize silage. Expected daily liveweight gain in the feedlot is 1.1 kg/day.

- Liveweight at slaughter is around 380–420 kg. This is mainly driven by consumer preference for smaller sized, lean cuts of meat. There seemed to be consumer resistance to fat on the cut of meat. Killing out percentages are 0.58, with the best doing 0.59.
- The price of finished cattle is around the $1.30 USD/kg deadweight. (£0.66/kg !!!!).
- No growth promoters are used.
- Even on the biggest estancias, cattle are grazed on the poorer land that was not good enough to crop. Generally on the Pampas two thirds of a farms profit came from the one third of the land that was in crop. The other third came from the two thirds of the land that was used for cattle. In effect, cattle were not the main enterprise.
- The best of land on the Pampas sells for $4000/ha (£810/acre).
- Good cattle operations on the larger estancias are aiming for gross margins of $260/ha. (£55/acre), net profit of £45 per animal sold.
- There is little or no hanging of the carcass. Again, this is consumer driven and by my own market research I can report that the steaks were tasty, juicy, but just a bit tougher than the meat here. The beef did taste different from UK beef, but it was always of consistent quality. Export meat is hung for longer. Processors are on a 48% margin from producer to retailer.
- Very little of the carcass is wasted in Argentinean butcher shops with almost every part of the animal eaten. On one mixed grill I even discovered heart! Surprisingly tender and tasty.
- Fuel is only 30p/litre, which is considerably cheaper than UK prices, although a double-cab pickup would still cost about £9000. Most machinery is imported from Brazil and is usually worldwide brands that are made under licence.
- Most of the finished cattle produced in Argentina are sold through Liniers market in Buenos Aries. On a 30 ha site in the middle of urban sprawl it can handle up to 30,000 cattle each day. Cattle are trucked in from all over the pampas the night before and sold by one of the 50 or so auction companies operating within the market. For biosecurity reasons, Liniers only handle killing stock and has two dedicated television channels reporting the sales. All droving work inside the market is done on horseback with auctioneers and buyers on raised walkways.
- Traceability is only by animal group from finisher to slaughter. Liniers will put through more groups of cattle in a day than most UK markets will put through individually tagged animals.
- 90% of beef production in Argentina is consumed in Argentina.

Conclusions

The type of cow used in Argentina has been bred to suit the climate and the consumer. The Argentinean beef industry has evolved in response to market forces with no government support and little regulatory interference. Producers are very focused on consumer needs and deliver a consistent product. Beef is the backbone of the economy, due to the scale of consumption.

During my visit, the Argentine parliament banned the export of beef. Because export beef was making such a premium, due to favourable exchange rates, it was driving the price of domestic beef up and causing inflation to soar. I found it quite novel that a government was using an export ban on a commodity to control its country's economy.

The government has also introduced a minimum selling weight of 280 kg liveweight to encourage the retention of heifers, most of which would struggle to reach this weight, to be used as cows. The aim is to increase beef production to improve the economy without increasing the beef price on the street. Interestingly, none of the breeders or the breed societies I spoke to are doing anything to increase the size of cattle and most are unhappy with the government's handling of this issue.

Most of the cows I saw were Hereford Angus. They had to put enough condition on their backs during the grass growing seasons to take them through the periods of winter or drought. If you think the climate is bad here at home spare a thought for one of my hosts whose 5000 ha property on the pampas flooded in 2001 to a depth of 3 feet for a year and a half!

Most continental breeds would not be able to cope with such a regime of feast and famine and during my visit most of the cows would be condition score 1.5–2; thin and emaciated by UK standards, but when the grass came they would recover and replace condition.

The cows were of a smaller frame size than that found in the UK, but the idea on the bigger estancias was if the cow was smaller you could run more and that meant more calves. It was a numbers game.

As in the sheep industry in the Southern Hemisphere, most of the unwanted traits have been bred out of the animals. Birth weights were low, growth rates were good and anything that did not perform was not used for breeding.

Angus and Hereford are both very maternal breeds and the performance figures on most farms were extremely good, considering the low levels of inputs, especially labour.

Most of the best breeders are using performance recording and EBV's, but the majority of the commercial producers are not keen to invest in technology because of the attitude of the government. Because there is no stability and no security in the direction that the government will take, producers are unwilling to invest and, more importantly, plan for the next 10 years.

Frederico Mocorrea, G. Villages, Argentina.

One of the farms I visited illustrated the Argentinean attitude to profit and not production. Frederico Mocorrea, pictured above, farms 8000 ha near G.Villegas on the edge of the pampas. One third of his land is cropped, providing two thirds of his profit. On the other two thirds of his land is his secondary enterprise of 10,000 beef cows! His feedlot (above) had 7000 cattle in it during my visit and the only capital expense I could see for the whole beef operation was a mixer wagon and a truckload of second hand 200 litre drums used as feed troughs.

Interestingly, when asking farmers about financial figures they would all produce information in American dollars. Because the value of the Argentine peso fluctuates so much on world currency markets it is impossible to use it as a measure of the success of a business. Consequently all calculations and reports are converted into the most widely used stable currency for accounting purposes, the American Dollar.

During my visit to Liniers market I met James Riva, branch chief of the Audit, Review and Compliance section of the United States Department of Agriculture, who was there to rubber stamp exports of beef from Argentina to the US. I was also told that the US was looking at fattening more cattle in Argentina, using grass, not wheat!

Uruguay

With a population of just under 3.5million, Uruguay seems considerably smaller than Argentina, but has a land mass almost identical to the UK.

With only the River Plate separating these two countries, Uruguay is very similar to Argentina in its attitude to beef production and consumption. My first experience of lunch in Montevideo at the old city market, was the biggest steak I have ever seen and a shared bottle of wine. That was it, nothing else! At about the same size as a Scottish sirloin, but three times the thickness, I did not have much of an appetite left for peas and tatties.

With a national cattle herd estimated at 12.5million head, Uruguay produces around 650,000 tonnes of beef each year, of which 7600 tonnes are imported into the UK.

The political scene is typically South American, with a general haulage and agricultural strike imminent during my visit in protest of a government plan to subsidise city bus and train travel by increasing taxes on fuel. As nearly half the population lives in Montevideo, such a scheme would appeal to city voters during the imminent general election, but with no fuel being delivered to petrol pumps in the city, the politicians would be compelled to adjust their manifesto.

Successive governments have taken their toll on the country's economy and infrastructure, but the beef industry seemed to be managing quite well in the circumstances. Upgrading and investment was apparent in abattoir facilities, the result of lucrative export contracts, with new technology to the fore. On a visit to one of the biggest abattoirs and processing facilities, Frigorifico Matadero Carrasco S.A. in Montevideo, I was shown the latest equipment installed to measure the fat content of every box of minced beef off the production line. This was a very important measurement for the major burger chain they supplied abroad.

Uruguay – Main Points

- Pure Hereford breeding was more widely used than in Argentina. Uruguay exports 80% of its beef production and its customers are looking for a larger carcass and cuts than the Argentinian market.
- Most of Uruguayan beef is finished at grass with fewer feedlots used, as most farms are purely cattle operations. This explains the predominant use of Herefords with less reliance on cereal based finishing diets.
- Uruguay does not have individual traceability, but any group movement has to be inspected on farm by a vet for disease and the movement document stamped by the local police.
- All cattle are vaccinated for Foot and Mouth. The Brazilian border is only too close and most of it is a river that dries up during summer. Uruguay is considered by the World Organisation for Animal Health (OIE) to be "FMD free with vaccination". This status allows Uruguay to export unprocessed beef to the US.
- Exports are to Sweden, Norway, Spain, Italy, Germany and the UK. All of the meat is de-boned and of the highest quality. Most of the cheaper cuts and the offals are exported to China.
- There are 3.4 times more cattle and 3.5 times more sheep than people in Uruguay
- Many of the larger farms keep a flock of sheep, Romneys usually, not for sale, but home consumption to feed the gauchos and their families.
- The abattoir grading system is similar to the EUROP grid used in the UK. Abattoir bid prices pre-slaughter are based on previous quality performance figures as well as the base price grid. Consequently, the better breeders and finishers that concentrate on the quality of their end product are paid more for their efforts.

Conclusions

Uruguayan farmers are more focused on producing beef off grass. This is mainly due to the grazing land typical of Uruguay where the majority of the farms have no area that can be cropped. The Hereford breed is mainly used for that reason.

Good forage conversion is important, and cereals are too expensive and not easily sourced. Again there is little or no continental breeding, as that type of animal would not survive in the production system, and the type of quality markets targeted by the Uruguayan processors are demanding the quality and taste that can be obtained using the Hereford breed.

As in Argentina, illiteracy is a problem among the gauchos that do most of the work on the larger estancias. As a consequence, full traceability will be a problem for the industry in the future.

Black Baldies at Branga Plains, Walcha, NSW.

Australia

Australia was a wonderful place for the Scottish tourist in November 2006. A fantastic coastal climate, an abundance of high quality food and wine, and the Australians unerring ability to throw a bit of leather at some English cricket stumps. I don't think I have ever seen so many grumpy looking Englishmen in the one place.

With a population of just over 20 million on a land area approximately equal in size to the United States, life in Australia is pretty laid back. "No worries, mate!" just about sums up the whole continent, apart from its attitude to sport.

Australia has become the world's largest exporter of beef. Since 1985, Australian exports have increased 60% and are expected to reach 1.1 million tonnes in 2007. I visited operations in New South Wales and Queensland where 71% of Australia's beef is produced from a national cow herd of just under 13 million head.

Australia – Main Points

Australian beef is primarily grass fed, and finished in large feedlots. The biggest one I visited was Beef City near Towoomba, Queensland, run by Australia Meat Holdings Ltd., with 24,000 cattle on the 39 ha feedlot. The sheer scale of the operation is hard to imagine. A mill mix system handles 400 tonnes of concentrate feeding each day, with a dedicated abattoir next to the feedlot.

As in South America the weather has a dramatic effect on the breeds of cattle used and the amount of beef produced. At present Australia is in the middle of one of the worst spells of drought this century. This has had an impact on the quality and quantity of forage and grain, forcing many farmers in the hardest hit areas to sell their cattle. Feed grain supply has also become an issue which could see the reduction of exports of beef. Feed barley and wheat prices are now around the £140/tonne mark! Imports of grain are effectively banned under pest control regulations.

Traceability is completely electronic, but only from the holding of birth. The calf's dam or sire is not recorded on the system. Interestingly, the price of an electronic tag in Australia is less than the price of a normal primary tag in the UK, and they are made by the same companies.

Breeders

- In the more temperate region of Australia, where the farming is of greater relevance to the UK, most breeders are using Angus or Angus X Hereford cows. As in South America, farming businesses are considerably larger than that in the UK and labour is scarce. Stock has to be of the type that will produce with very little stockman intervention.
- Stock also has to have the ability to survive extremes of weather, mainly drought, and be able to recover quickly when the rains and the pastures eventually appear.
- The biggest producers run a pure herd of either Angus or Hereford, or sometimes one of each, to supply them with F1 replacements and pure bulls for the commercial herd.
- Most breeders breed their own replacements and only buy in stock bulls.
- All replacement heifers calf as 2 year olds.
- The best producers have a proper breeding strategy, and are very market orientated whether feedlot or sale yard.
- F1 cows are also mated to continental bulls, mainly Charolais, as a terminal sire.
- Most pedigree breeders market their bulls at their own on farm sale in purpose designed sale yards.
- As in South America cows are kept on land that is not suitable for cropping, and on the biggest arable places are a bit of a sideline, even in numbers that would be considered large scale in the UK.

Summary

All the herds that I visited were using maternal native breed cows. The most common breeds were Angus, Hereford and Shorthorn. Continental breeds were only used as terminal sires and none of their female calves were ever kept for breeding. The reasons given were mainly temperament, calving ease and fertility.

Producers were very aware of EBV's and their value, and selected bulls mainly on low birthweight and marbling. The scale of individual operations and the low level of labour input provided the direction for cow type selection.

As in South America, the limited availability of dairy bred replacements has forced the beef industry to come up with a replacement strategy. Without production-distorting subsidies, they have bred a cow for profit.

Drought conditions have not yet affected Australian meat production, as producers in the hardest hit areas are selling cows and breeding stock for slaughter. In the longer term, beef exports will be cut as it will take time to restock when the rains appear.

Beef City, Towoomba.

Feedlots

Feedlots were developed by the Australian beef industry primarily to improve eating quality. Grass based finishing systems were widely used, but the huge distances involved in transporting cattle to slaughter had a detrimental effect on eating quality. Animals would arrive stressed after days of transport and the consequent dark cutters would downgrade the meat. Some of the biggest feedlot operators, such as Australian Meat Holdings at Towoomba, have an abattoir adjacent to the feedlot.

- Feedlot operators are mainly using Aberdeen Angus type cattle especially those with high marbling EBV's for Wagu type beef production for Far East markets. Shorthorn and Hereford are the next most popular.
- Animals arrive at the finishing feedlot, usually next to an abattoir, from feeder feedlots to minimise stress and avoid dark cutters.
- No bull beef is used as there is consumer resistance on taste.
- On arrival, animals are given a health check and routine dosing, including a Hormone Growth Promoter, and graded into appropriate pens. Interestingly, no genetically modified feeds are used.
- Entry weights are normally between 350–400 kg, and fattened for 90 days on a strictly controlled cereal based ration.
- Finished weights are between 500–720 kg, at the upper end for Wagu style beef. To say these animals looked fat would be a gross understatement. A European 5H grade would be nowhere near it. They can be best described as looking like one of the old pedigree paintings from the 1800's – as round as barrels!
- In the abattoir most of the 25–30mm of back fat in Wagu style beef production is removed from the carcass which is then dressed to specification.
- Grading is based on a cut made through the eye muscle, which is measured for marbling, size, pH and colour.
- Strict traceability is in place for the entire period each animal is in the feedlot. The main reason is to identify the calf producers that are breeding animals that reach the top abattoir specification. Detailed records are kept to calculate an index based on marbling yield and feed conversion using a formula worked out by the company's statisticians. Consequently, these breeders are paid more for their stock when they enter the feedlot.
- All stock has electronic identification and traceability back to the holding of birth, although there is no traceability back to the dam.

Summary

The feedlot system is a fantastic way to produce consistent quality beef. Animals are fed on a strict ration in a controlled environment, in some cases next to the abattoir, to reduce stress and maximise the product. Producers are paid a premium for animals entering the feedlot that are genetically similar to the previous high quality batch.

Computers in the office are linked to feed wagons and loaders to enhance accuracy and minimise operator error. There is even a programme that works out how much feed has gone into each pen on the feedlot to determine when it should be mucked out! The feedlot industry is a huge business in Australia and targets the highly lucrative Japanese and Korean markets. Australia annually exports some 300,000 tonnes and 100,000 tonnes respectively to these countries.

What Did I Learn?

My study of the world beef industry took me to Argentina, Uruguay and Australia, three very different countries with interesting political outlooks to say the least. I tried to stay in the parts of each of these countries that had a similar climate to the UK to try to learn as much as I could that was relevant to beef production in the UK.

What I found on both continents were producers that are, almost exclusively, using just two breeds of cattle. Nearly all the cows in the temperate regions of these countries were either Aberdeen Angus, Hereford or a cross between the two. Indeed the F1 cross, the first cross, known as the Black Baldie, was by far the most popular cow on the bigger scale operations. Even the pedigree Angus and Hereford breeders that I visited admitted that the F1 cross made the best suckler cow. Continental breeding does not seem to have made any impact in these countries, for a variety of reasons:

Scale

The scale of some of the cattle operations would dwarf the largest in the UK, and the biggest systems have been designed to accommodate the problems associated with their size. Skilled labour does not seem to be in short supply, but each stockman can be expected to look after up to 3000 head. With these sorts of numbers, the operation has to run smoothly, with little or no stockman input during calving, and a high overall standard of health to minimise treatment and handling. Stock has to be docile to be run in the numbers on vast areas of grassland without incident. Can you imagine the chaos caused by 500 Limousin cross stirks running about in one batch?

Labour input per cow is extremely low compared to UK farming and the average size of each operation is considerably bigger. Whether both of these factors can be introduced into UK farming practice is another matter.

Increasing the scale of a UK beef enterprise is quickly becoming uneconomic due to rising land prices. In my own area, South West Scotland, land prices have almost trebled in the last 5 years driven mostly by high commercial land prices in Northern Ireland.

Fertility

Climate has also had a big influence on breed selection in these countries. Variable growing seasons and extremes of hot and cold mean that the animals have to thrive in many different conditions. When pasture is scarce the animal has to survive a lean period, possibly with a calf at foot, and still be able to recover condition when the grass reappears. This climate would be far from ideal for continental type cattle that need to be constantly on a positive daily liveweight gain. Fertility is the first production trait to falter when an animal is under grazing pressure. Native breeds have been found to be more fertile in these conditions than any other breed.

The Consumer

Consumers and export markets have demanded beef with juiciness, texture and taste, and cuts of a smaller size that cannot be obtained from larger continental type cattle. Grading standards are geared to the eatability of the beef, not on the shape of the hanging carcass used in the EUROP grid. This has encouraged producers to use breeds with good eating quality, not breeds with shape. Of the *bos taurus* breeds continental type cattle would not be profitable in the climate and production systems. With producers mainly using Angus or Hereford, finishers and feedlots are able to produce a fairly uniform product on a huge scale. There is still enough variation within these two breeds to satisfy most markets and finishing systems. Feedlots certainly favoured sourcing Angus cattle as much as possible but would use other breeds for different markets.

Bos indicus breeds, such as Brahman and Neolore, that are suited to warmer climates are renowned for their poor eating quality. The grading systems employed have been developed to identify cattle presented at abattoirs with this type of breeding.

Replacement Availability

With a larger proportion of beef herds than dairy herds breeders have had to source replacements from specialist breeders or use a system to produce their own. A plentiful supply of dairy cross heifers in Europe has seen a large proportion of the beef herd sourced from dairy breeds. These probably produced the best suckler cows when the dairy industry was using Friesian genetics, but as more Holstein bloodlines have been used they are becoming unsuitable as a beef cow.

Financial

Probably the biggest single factor affecting the breed selection of suckler cows in these countries has been the absence of any sort of production subsidy. Each cow on a South American estancia, or an Australian cattle station has to produce a calf every year to justify her existence. The Suckler Cow Premium gave European producers a safety net whereby a cow did not need to have a calf to make money. Easy calving genetics, to ensure a live calf per year per cow, are placed above conformation in a subsidy free system.

How Can This be Applied in the UK?

Key Factors Affecting Suckler Cow Profitability

Fertility

Reproduction is the main factor limiting the production efficiency of beef cattle. The breeding female has to have a live calf each year. To maximise the profit, the calf should be of the highest possible quality, but not at the expense of stillborn calves and casualty cows from difficult calvings. Cows that are not in calf, or are running without a calf, are a drain on resources and profit.

The largest loss of the potential calf crop occurs because cows fail to become pregnant. Post calving infertility and anoestrus in heifers was recognised as a problem nearly 80 years ago, *(Hammond, 1927).*

The period from calving to first cycle, or oestrus, is commonly referred to as postpartum interval (PPI). This is the most logical measure of the commencement of potential fertility.

Many studies have been done looking into the effects of breeds and genotypes on postpartum intervals. Dairy breeds that are milked have shorter PPI than suckled beef breeds, but when dairy cows are suckled, they have longer PPI than beef cows.

Comparisons have also been made within studies that have shown that, when managed comparably, dairy genotypes have longer PPI than beef genotypes and that these effects are more pronounced at first calving and at the lower dietary intakes that are found in beef suckler systems.

The table below 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.

	Current Performance	Improve % Reared by 6 Calves
Calves Reared %	88	94
Av. Weight per Calf kg	285	285
Av. Calf wt. Per Cow kg*	251	268
Average Price p/kg	1.25	1.25
Output per Cow	£314	£335
Change in Output		£21
Change for 100 Cow Herd		£2138

Source SAC Perth

*per 100 cows put to bull.

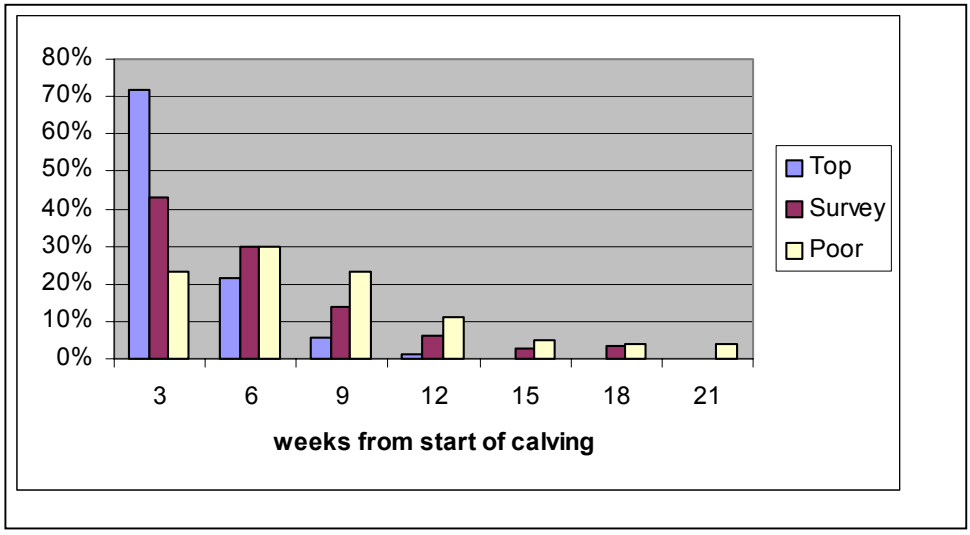
Rearing another 6 calves increases the average calf weight reared by each cow by 17kg. Calf output per cow rises to £335, an improvement of £21 per cow, or £2138 for a 100 cow herd.

By tightening the calving pattern weaning weights will also be increased. This is probably the easiest way for a producer to increase herd profitability. 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 to a tight calving pattern, where calves born in the 1st, 2nd, 3rd and 4th three week periods and with 65%, 25%, 7% and 3% of the cows calving in these periods respectively, will increase average weaning weight by 30kg. This extra 30kg increases average calf output per cow to 296kg per cow, a financial gain of £35 per cow.

The total net gain in the example above is now £56 per cow better than current performance, or £5662 per year for the 100 cow herd - a significant increase in profit.

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



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.

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. The chances of these animals calving within the herd calving pattern are very slim as they will have to start oestrus and conceive almost immediately after calving.

Clearly herd fertility is more than just getting cows in calf. A compact calving period will increase average weaning weights, but will also increase overall herd fertility as cows have a larger interval between calving and bulling periods.

Sexual Maturity

Most suckler cows that are used in the UK are calving somewhere between two and a half to three years old. The thinking behind this is that the heifer needs to be nearly mature weight when calving takes place. Indeed, some producers will not bull their heifers until the animal reaches its mature weight.

In all the countries that I visited every heifer had entered its productive life and calved at two years old. There are a number of reasons why the breeders had taken this approach:

- The animals are more fertile at a bulling age of 15 months.
- The heifer calves from a single calving period can be used as replacements.
- Calving at a young age can reduce the mature weight of the cow.
- The heifer enters productive life far sooner and will last longer.
- Infertile animals can be taken out of the system sooner.

In cattle, age at puberty is related to body size, milking potential, breed and environmental factors. Smaller cattle and cattle with higher milk yield have been known to mature earlier. Animals whose nutritional requirements are not being met will reach puberty later.

Temperament

On my travels this was one of the most important factors in the breed selection of different systems. Australia is already using electronic speed guns to select heifers for breeding based on how quickly it exits the handling crate. Anything over a certain speed was diverted to the fattening pen and never got to the bull! Bearing in mind that this is being used in a breeding system that compared to some UK systems does not have a temperament problem, it was interesting to note that it was still considered important.

Australian studies found that the difference in daily weight gain between the animals with the best and worst temperaments was about 0.4kg DLWG over the animal's lifetime. In a feedlot this effect was amplified and over an 85 day finishing system it could amount to 70kg.

Over all breeds the steers with the lower flight times (good temperaments) grew faster and had heavier carcasses than steers with poor temperaments. The more docile animals had higher feed intakes and better feed conversion ratios than their more temperamental counterparts. Another study by the Beef Co-operative Research Centre at Armidale found that animals with poor temperament had significantly higher levels of sickness. These figures are being used to indicate that flight time measurement can be used to identify cattle with the right temperament to achieve maximum feedlot performance.

When talking to producers in the UK the first thing that normally comes up in any conversation about cows is temperament. Every farmer has experience of cattle with "social issues".

I'm sure everyone has a story to tell of wild cattle, but my favourite was told during a visit to Orkney. An Angus x Limousin cow had taken a dislike to the unfortunate stockman trying to tag it's calf and had chased him through the front two seats of his pickup!

As labour has become scarcer on farms, the need for easily handled cattle has become more important, not only for the pleasant working experience, but wild cattle can cost you a lot of money in repair bills, and pickups! It is extremely important to select breeds with a calm temperament, or at least use a breed with good temperament to cross with and breed some calmness in. Not only will this save time and money, but the increased liveweight gain of the quiet animal sitting in the corner cudding will increase profit too.

Feed Requirement

For producers in the Southern Hemisphere, feed requirement is also a factor in the selection of the breeds used in the cross cow. With varying levels of forage quantity and quality the animal must be able to deal with feast and famine yet still remain productive. Producers need a cow with a low daily feed requirement and the ability to put condition on and off its back, as the seasons dictate feed availability. Consequently, no continental breeding is used whatsoever as these breeds have been found to be too hungry in times of plentiful supply and unable to deal with fodder shortages.

Monitor farm trials on outwintered dry cows have shown native breed crosses could be fed 20% less silage per week than Continental cross and dairy cross cows. It was suggested that the native breeds had found it easier to put on condition over the summer grazing period with a calf at foot, which allowed a slightly less than maintenance winter ration to be fed. Continental and dairy cross cows had entered the winter with a low condition score and required a maintenance plus ration. As predicted, the native breeds, that have been bred and developed as grazing animals, utilised grass and put on condition during the summer months and reduced winter feeding costs. All types had access to identical grass quality and availability, but the native breeds seemed to utilise the swards more effectively.

In the UK, where grazing availability is a less relevant issue, the feed requirements of individual animals are more closely related to size. However, changes in grazing patterns and availability due to climate change could have an effect on breed choice in more southerly parts of the country.

Size

Cow size in the Southern Hemisphere would best be described as medium frame, but with good condition. Producers favour a smaller cow that consumes less forage and has an efficient production-to-weight performance. The effect of calving at two years old also keeps the mature weight down to a medium frame size, effectively stunting the growth of the cow. In my own experience at Drumdow, experimenting with bulling dates has shown cows that calved at three years old for the first time have a mature weight of over 800kg. This is far too big. Meanwhile, cows that entered the herd as two year olds have a more acceptable mature weight of around 600-650kg. The breeding being the same in both cases. Obviously the calves out of each of these cows have the same genetic potential to reach the same finished weight, but the smaller cow will cost less to keep.

I have found a huge amount of resistance among UK farmers to use a cow with a medium frame score, all of them convinced that big is best. While there may be some production systems where the availability of large quantities of competitively priced feedstuffs will suit large frame cows, especially in autumn calving herds where the cow is not at grass and producing milk to feed a calf, the majority of UK herds are spring calving. In any case, it is a simple fact: big cows eat more.

Furthermore, large frame score cows need more space at housing. The use of a smaller cow would allow a producer to increase numbers without increasing housing costs. Producers in Orkney predicted they could house up to 10% more cows on their existing slatted systems if they moved away from large frame Simmental types.

In recent years, the mature weight of cattle has tended to increase in many breeds. This is clearly evident from the published genetic trends available from Breed Societies recording on Group Breedplan (e.g. Angus, Hereford, Simmental). A consequence of increased mature weight is to increase liveweight at weaning. However, there is evidence that increasing the mature weight of the cow by 1kg will not increase overall profitability unless the weaning weight of the calf increases by more than 1kg.

Longevity

Longevity plays a very important role in the profitability of a suckler herd. The table below shows a simple example of three herds with different replacement rates. Herd C only gets another four years out of the cows it is using but it is costing over £4000 less each year on replacement costs than Herd A. Even increasing the longevity of the cow by only one year has reduced the replacement cost by £20 per calf weaned.

Longevity	**Herd A**	**Herd B**	**Herd C**
Lifetime Calvings/Cow in Herd	6	7	10
Replacements/Year/100 Cows	16 – 17	14	10
Cost of Replacements/Year (@ £1000 for In Calf Heifer less £300 for Cast Cow)	£11,666	£9,800	£7,000
Replacement Cost/Calf Weaned (95% Calving)	£123	£103	£73

This example does not include culls for reasons other than age, such as soundness, fertility or casualties. With some herds experiencing up to 20% infertility, replacement costs per calf weaned could easily double. The cost and rate of replacements can have a bigger impact on herd profit than any premium gained for outstanding store or finished calves.

With its higher replacement costs, Herd A would need to obtain a premium on its yearling calves of 15p/kg to have the same overall profit as Herd C.

How long a cow will last is dependant on a number of factors and the interactions between them. Fertility, sexual maturity, calving ease and udder conformation are the main limiting factors in cow longevity, but when all these factors are studied as a whole it becomes clear that breed has the biggest influence on how long a particular cow will last in a system.

Milk

How much milk does a beef calf need? Well obviously it needs *enough*!

Milking ability is related to mature size in the sense that larger animals have the inherent ability to consume more feedstuffs that may be used for milk production. However, this does not mean that all large breeds are heavy milkers or that all small breeds are light milkers. Selection for, or against milk production within a certain mature size is an effective tool. Cattle selected only for increased milking ability, without consideration for other factors, tend to increase in body size with some reduction in muscle expression.

The main reason for increasing milk production in beef cattle operations is to increase the weaning weights of the calves. However, there are several reasons why high milking ability can be undesirable.

Heavy milking cows often produce milk at the expense of other body functions. If nutrition is inadequate, heavy milkers may become thin. Research has shown that thin females are less likely to come into heat and are harder to settle than those in good flesh.

There is also evidence that heavy milkers may be slow to cycle even when heavily fed. This lengthens the breeding interval and reduces general reproductive efficiency.

The general opinion in Australia is that feeding the cow to produce milk to feed the calf does not maximise profit. Many producers will wean at around 5 months and dry the cows off on the poorest pasture while saving the best for the calf. This practice is even more effective when feedstocks or pasture is scarce.

Another problem is udder soundness. This affects milk production, milk consumption, and, ultimately, calf weaning weights. Proper udder attachment in a beef female is important for a long, efficient, productive life. A sound udder should be firmly attached with a strong, level floor and four properly formed teats proportional to body size. Weak udder suspension results in pendulous udders that are difficult for a sucking calf to nurse. Balloon or funnel-shaped teats are also difficult to nurse and may hurt calf milk consumption and weaning weight. Balloon teats are also an indication of past mastitis. The udder should be healthy and free of mastitis in all four quarters for good milk production.

Dairy sourced replacements have always been popular with beef herds because of the quantity and quality of milk they can provide the growing calf. As the dairy industry has pursued its own breeding objectives over the last 10 years, the genetics used have focused almost solely on milk production. Using a cow as a suckler that owes half of its genetics to a dairy animal is proving to be a huge problem for the industry. Not only are the udders and teats too big for one small calf to cope with, but the udder attachment is also poor and one of the main reasons for a lot of premature culls.

By the time the calf is big enough to exploit all the milk on offer from the cow, the rearmost teats have often dried up or become so low to the ground that they are unavailable.

Most beef breeds have been bred to produce adequate amounts of milk for a healthy thriving calf. Studies have also shown that the milk is also of very high quality, reducing the need for volume. The main reason for beef producers to use dairy bred replacements was availability, with good milk production as a bonus. The biggest excuse amongst producers for not using a beef breed cross cow is that it does not look as if it has enough milk. Clearly though, it does have *enough*.

Calving Ease

It is a common misconception that a big cow will produce a big finished calf. In reality it is the genetics of the cow and the bull that determine the mature weight of their offspring. Many UK producers are using large framed cows to accommodate high birthweight breeds such as Charolais, but because the cow has high birthweight genetics, such as Limousin x Holstein, it's calf has at least three-quarters high birthweight genetics, which can lead to calving difficulties. Using two maternal breeds in the genetics of the cow with low birthweights will reduce the birthweight of the calf, leading to fewer calving problems.

Difficult births, known as dystocia, have a major effect on PPI and ultimately cow fertility. Increased labour and veterinary costs along with cow and calf mortality can severely affect profitability. Studies have shown that high birthweight breeds have a higher incidence of dystocia.

The use of EBVs can help a producer to pick easy calving bulls within each breed, but there is far greater variation between breeds.

Pelvic size can also be a contributing factor to calving problems with dairy breeds having some of the narrowest pelvic measurements. Studies have also shown that birth weight and pelvic area are highly correlated, so some of the potential benefit from larger pelvic size in reducing dystocia may be offset by a corresponding increase in birthweight. In other words big cows tend to have big calves.

Calf Vigour

Poor vigour has a huge impact on survivability in newborn calves. They are slower to stand after birth, ingest low quantities of colostrum and are more likely to suffer from hypothermia and disease. Calves born with high birthweights, and calves born from breeds with high birthweights, have been proven to have poor vigour. The biggest Charolais calf I saw born took two days to get to his feet!

This is one area where the line between profit and production is not so clear cut. High birthweight calves tend to achieve high mature weights and command high prices.

The best compromise is to use a bull with low birthweight EBVs within the chosen breed to ensure a live calf birth and good vigour.

Outwintered/Housed

I have always found it interesting that the cow that suits my own system at Drumdow using Black Baldies is exactly the same breed cross as most of the suckler cows in the Southern Hemisphere. The difference is that I arrived at this cross by a completely different route.

As all my cows are outwintered, I found that anything with continental or Holstein breeding was not lasting in my system. Weaning weights and calf conformation were good but fertility and longevity were poor, mainly due to low condition scores. There were a couple of hardier breed crosses that I had not tried, such as Saler and Galloway, but most of these were ruled out either on temperament or low mature weight (or both!).

With the cost of erecting and managing housing for beef cows deciding whether an enterprise survives, more producers are looking to use outwintering systems, such as corrals or stubbles, to reduce the cost of keeping the cow. Recent studies by SAC have estimated that £80 per cow per year can be saved by switching to an outwintered dry cow system. Cows are also fitter at calving and experience fewer calving problems.

More flexibility, and ultimately profit, can be built into a system where the producer has the option to outwinter the cow. Breed choice though is important and the cow has to be suited to the system, but if you look upon the suckler cow as an asset that will be on the farm for, hopefully, around 10 years, she might have to adapt to many changes in the market during her productive life.

High Cast Value

This is the one area of suckler cow production where big is best. The heavier the cow, the more money it will realise in the cast ring. It has to be balanced with an ability to put on condition profitably once the decision to cast has been made. Continental type cows will generally go to higher weights, but may take more feeding to gain condition.

High cast values make buying replacements a much more pleasurable experience, but longevity has a far greater effect on cow profitability than cast price.

Purebred or Crossbred Cow?

Why choose Purebred?

- Easily managed. No complicated breeding programme.
- Consistent product.
- Easy to colour batch groups.
- Minimum number of stock bulls needed for small scale producers.

Why choose Crossbred?

- Hybrid vigour
- You don't need to buy a whole herd to get started. Just buy a bull.
- Easy to breed out specific breed problems. For example use a Charolais if you want higher finished weights. Use an Angus if you want easier calving.

Breeding Programme Options for a Crossbred Herd:

The most commonly utilised crossbreeding systems include:

1. Two-Breed Cross
2. Two-Breed Rotational Cross
3. Three-Breed Rotational Cross
4. Static Terminal Sire
5. Rotational Terminal Sire

These systems are listed in order, from least to most demanding in terms of facilities and labour. The same ranking applies to the realised benefits; the two-breed cross is the easiest to manage but results in the least heterosis and little opportunity for breed complementarity. Use of artificial insemination (AI) or multiple breeding pastures is required for use of complex systems.

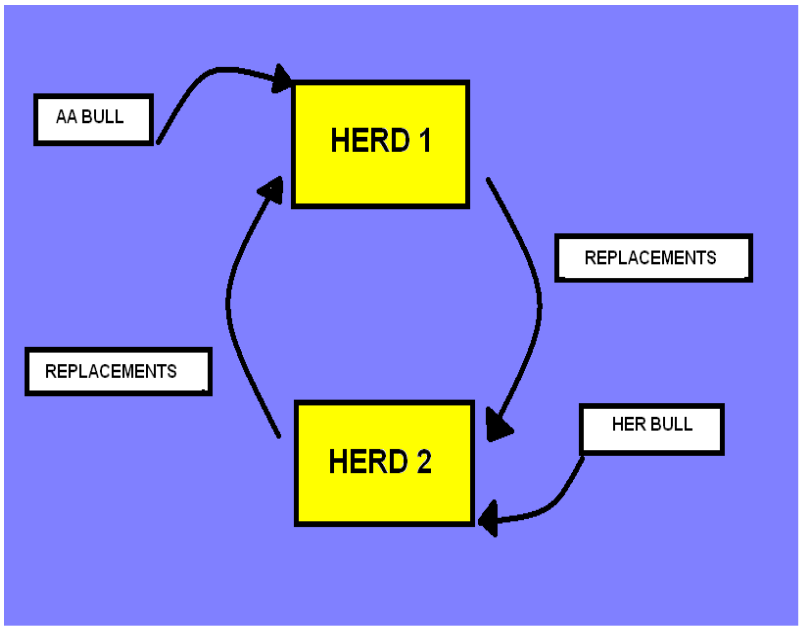
1. Two-Breed Cross

The use of a two-breed cross involves maintaining straightbred cows of a single breed and mating all females to a bull of another breed. This is a simple system that requires only one breeding pasture, but realises less than half of the possible heterosis. The use of a two-breed cross allows realisation of direct heterosis (advantages of a crossbred calf), but not maternal heterosis (advantages of a crossbred cow). All other systems result in both direct and maternal heterosis. A further drawback is that straightbred females must be purchased as replacements to continue the breeding programme. A possible use of this system is in the generation of F1 (purebred x purebred) replacements for sale to producers who use more complex systems. This would be a means for owners of small herds to "add value" to their cattle.

2. Two-Breed Rotational Cross

In this system, bulls of two breeds are used. Females sired by a bull of a particular breed are mated to a bull of the other breed. Thus, after several generations, approximately two-thirds of the genetics of each calf result from the breed it was sired by, with one-third from the other breed. The two breeds will be equally represented within the herd if the number of each breed culled each year is equal. If natural service is used, this system requires at least two breeding pastures and requires that both breeds used be approximately equal in terms of size, nutritional requirements and maternal potential.

Two Breed Rotational Cross



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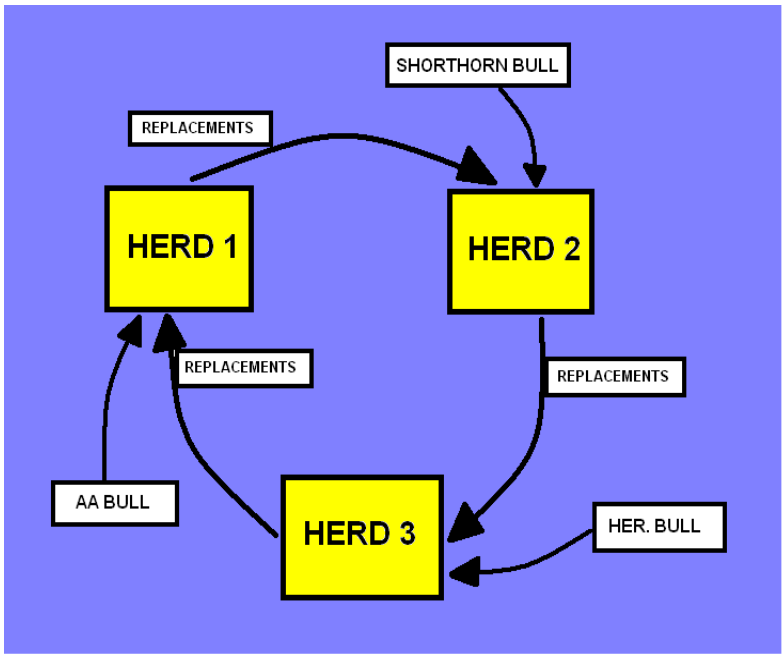
3. Three-Breed Rotational Cross

Nearly all of the possible heterosis is realised with proper management of a three-breed rotational crossbreeding system. This system is similar to the two-breed rotational cross except that three breeds are used. As in the two-breed rotational cross, females are mated to a bull of the breed that is least related to them (the sire breed of their maternal grandam).

Benefits include a high degree of heterosis and potential for outstanding breed complementarity. However, this system is more difficult to maintain than the two previously described and at least three breeding pastures are required if AI is not used. In herds of less than 100 cows, the cost to maintain adequate bull power in each of three breeds may be prohibitive. Furthermore, inclusion of three breeds may make it difficult to maintain a uniform herd.

Three breed Rotational Cross



4. Static Terminal Cross

In this system the herd consists entirely of F1 females that are mated to bulls of a third, terminal sire breed. All calves are marketed. Only one breeding pasture is required and heterosis and breed complementarity can be nearly maximised. However, F1 replacement females must be purchased. Locating a steady supply of economical, high-quality, beef bred replacements can be difficult, especially in the UK.

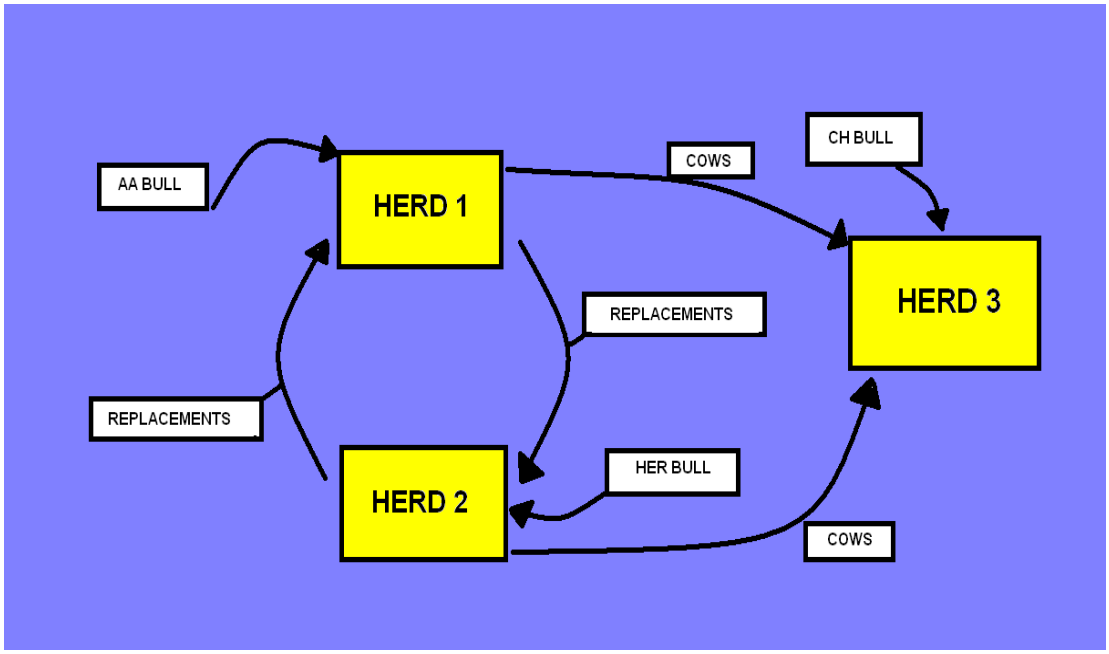
Interestingly, this is the system most UK producers are using already where dairy cross beef heifers are purchased and put to a terminal sire.

5. Rotational Terminal Sire

This system, which is used in many pig herds, is similar to the static terminal sire system, except that a portion of the herd (typically 20 to 30 percent) is designated for production of replacement females. These females are maintained separately from the rest of the herd and mated to bulls of a maternal breed, possibly in a two-breed rotational system. The majority of the cows in the herd are mated to a terminal sire and all calves marketed. This can be a demanding system to maintain but will produce excellent results.

A more feasible variant may be to mate all heifers to maternal breed bulls and keep replacements from them while the mature cow herd produces only terminal-sired calves. The logic behind this is that heifers should be managed separately from mature cows anyway and that most (but by no means all) maternal breed bulls are easier calving than terminal breed bulls. This may make AI of heifers to high-quality maternal bulls a practical way to upgrade the maternal performance of the herd over time.

Rotational Terminal Sire.



Composite Breeds

Since managing heterosis can be difficult, some breeders have developed composite breeds such as Barzona, Santa Gertrudis, Stabiliser etc. A composite breed results from a planned mix of purebreds that has been conducted in a manner such that a consistent population is produced. Individuals of the composite breed can be mated to each other with successive generations retaining the same percentage of the original breeds. The advantages of composite breeds include ease of management, consistently high heterosis and the possibility that a particular composite breed may be ideal in an environment for which it was specifically developed. On the other hand, some would argue that the heterosis is diminished after several generations. Also, few sources of breeding stock exist for any new composite breeds that are developed. Most composite breeds developed to date were designed for stressful environments such as desert. Currently, scientists at universities and at the USDA research centre in Clay Center, Nebraska, as well as individual breeders, are attempting to develop composite breeds for other environments.

Summary

Crossbreeding is one of the most effective low-input, high-output management practices that a beef cattle producer can adopt. There is little justification for straightbred commercial cattle. Effective crossbreeding is more than simply purchasing a bull of a different breed than the last one that was used, however. Crossbreeding systems with varying degrees of complexity offer benefits in proportion to the increased management that they require. It is crucial to an effective crossbreeding programme that the producer has a strategy and sticks with it. Without a strategy you end up with a zoo!

How to Maximise Suckler Cow Profitability using British Native Breeds

The Maternal Cow

The definition of the maternal cow would include most if not all of the factors that affect profitability. Fertility, temperament, mothering ability, milk production and calving ease among the most important. The cow has been bred to be used as a cow and not a by-product of a terminal sire breeding programme. In this type of system it is the native steer that is the by-product. Hybrid vigour is also used to maximise the effect of these factors in the most successful breeding programmes.

This was the most important aspect of all my visits during my studies. All of the producers I encountered were using a maternal cow. All of the genetics in all of the herds I saw were from British native breeds. There was no evidence of any terminal sire genetics being used in the breeding of cows or replacements. Terminal sires were used as terminal sires to produce high quality beef, but always mated to a maternal British breed cow. Some producers were using pure cows, but the majority were using a cross to maximise hybrid vigour. The breeds used depended mostly on personal preference and sometimes were dictated by conditions, but the three main British breeds, Angus, Hereford and Shorthorn, were almost exclusively used. As I ventured into more tropical climates I found some bos indicus breeds used in the cross, such as Santa Gertrudis, but these were still regarded as maternal breeds quite appropriate to produce a maternal cow.

In a maternal cow production system the sires should be selected for their own maternal traits, such as EBVs for milk and calving ease. My own view on this has changed recently and I do not now look for extreme figures as the bull in question is going to be mated with a maternal cow anyway, and any progeny will benefit from both the bull and the cow. However, if the producer is entering into a maternal breeding programme and the type of cow already in place has terminal sire genetics, care should be taken to select a suitable maternal bull with the correct EBVs to balance those of the cow.

The advantages of a maternal cow cannot be attributed to a single factor. It is a number of effects and the interaction between them that allows the increase in performance:

1. Hybrid Vigour
2. Sexual Maturity
3. Calving Ease
4. Weaning Weights
5. Easy Finishing
6. Longevity
7. Biosecurity

Hybrid Vigour

Many producers are already benefiting from the effects of hybrid vigour when they source replacement cross cattle from dairy herds. In order to fully utilise this effect, we need to fully understand the principles and the science behind the phenomena.

Crossbreeding (the mating of animals from different breeds) is similar in principle to a widely used mating system in straightbreeding programmes known as outcrossing (the mating of unrelated and therefore genetically unlike animals within the same breed). Traditionally, breeders have used outcrossing to increase performance levels within a breed by mating animals from distinctly different families or bloodlines. The results from crossbreeding are generally of larger magnitude than outcrossing, since, on the average, animals from different breeds will be more genetically dissimilar than animals from different families within the same breed. Consequently, the greater the difference in genetic makeup of the two breeds used for crossing, the greater the effect.

The genetic aspects of crossbreeding and outbreeding are, however, similar. There are two ways that crossbreeding can result in increased production levels. Firstly, crossbreeding provides the breeder with the opportunity to combine the desirable characteristics of two or more breeds, thus achieving a higher overall performance level of desired traits among the crossbred animals than would generally be found within a given breed. This is frequently called breed complimentarity, which refers to the strong points of one breed complementing or covering up the weak points of the other breed.

Secondly, crossbreeding increases productivity through increased levels of performance of particular traits due to heterosis. Increased productivity can result from heterosis exhibited by both the crossbred calf and the crossbred cow.

The Effects of Crossbreeding Angus, Hereford and Shorthorn Cattle upon Reproductive Performance (Oklahoma State University)

Breeding of Cow	Breeding of Calf	Calves Born (% of control)	Calves Weaned (% of control)	Weaning Weight (% of control)
Straightbred	Straightbred	100	100	100
Straightbred	Crossbred	101	104	105
Crossbred	Crossbred	106	108	110

Heterosis Defined

Heterosis is the correct name for the phenomenon that causes crossbred individuals to have an increased level of performance for certain traits over and above the average performance of their straightbred parents.

Heterosis is measured experimentally as the difference in performance of the crossbred animals from the average performance of the straightbred animals of the breeds involved in the cross. This difference must be measured at the same time under the same conditions and is expressed as a percentage of the average performance of the straightbreds.

For example, if the average weaning weight of the straightbred calves of breed A was 305 kg, and 295 kg for breed B calves, the average of the straightbred would be 300 kg.

If the average weaning weight of the crossbred calves was 315 kg the percent heterosis would be estimated as: [(315-300)/300] x 100 = 5%

Although heterosis is expressed by individual crossbred animals for various traits, only a few matings will not provide satisfactory estimates of the amount of heterosis for particular traits. In order to obtain dependable estimates of heterosis, performance must be measured on large numbers of crossbred and straightbred animals that are managed under the most uniform environmental conditions possible, with animals of comparable merit being involved in both kinds of matings. The requirements for dependable heterosis estimates are stressed in order to caution against drawing conclusions when the crossbreds and the straightbreds originate from different sources, or do not perform at the same time or place.

Experimental Estimates of Heterosis for Various Traits

Several well designed research studies have been conducted to estimate heterosis for various economically important traits. The average estimates of heterosis for some of the traits are presented in the table below.

Not all traits exhibit the same degree of heterosis. Generally, the greatest benefit from heterosis is realised for traits with low heritability, like reproductive performance of the cow and liveability of the calf. Highly heritable traits like feed efficiency and carcass quality exhibit little or no heterosis. This same general pattern would be expected for all breed crosses even though the actual amount of heterosis for a particular trait may vary somewhat from one breed cross to another. It has previously been pointed out that heterosis is measured in terms of the increase of the crossbred animals relative (crossbred avg. - straightbred avg.) straightbred avg. to the average of straightbreds. From a practical production standpoint, however, the producer should be interested in how much the crossbred outperforms the highest producing straightbred. Although most crossbreds will exhibit some heterosis, their level of performance for every trait will not necessarily exceed that of the best straightbred. An example of this is growth rate in Charolais x British native crosses. In such situations, the justification for making these kinds of crosses will be for combining the desirable characteristics of the two breeds rather than the heterosis exhibited for the trait.

Based on the accumulated experimental data, it appears that total production per cow in terms of kg of calf weaned per cow in the breeding herd can be increased by 20-25% by systematic crossbreeding systems involving the three British breeds (Hereford, Angus and Shorthorn). About half of this increase in total production is dependent upon use of the crossbred cow to take advantage of heterosis for fertility and maternal performance.

		Heterosis (%)	
Trait	**Heritability (%)**	**Two Breed Cross Calf**	**Two Breed Cross Cow**
Calves Born	**0 -10**	**1.5**	**1.6**
Calf Liveability	**0 -10**	**4.1**	**4.7**
Weaning Weight	**30**	**4.6**	**5.4**
Final Carcass Weight (Steers)	**60**	**3.3**	**---**
Pasture Gain (Heifers)	**30**	**6.5**	**---**
Food Conversion Efficiency	**40**	**0**	**---**
Carcass Quality	**40 -70**	**Little or None**	**---**

(Source: Oklahoma Cooperative Extension Service)

Genetic Effects of Crossbreeding

The genetic effects of crossbreeding are the opposite of the genetic effects of inbreeding.

Inbreeding results in depression with lowered rate of reproduction, reduced calf viability, rate of gain, delayed sexual maturity and delayed attainment of body maturity. In general, the same traits that exhibit the most inbreeding depression (low heritability traits like reproductive performance) are the same traits that exhibit the largest amount of heterosis under crossbreeding.

There are two basic genetic requirements for a trait to exhibit heterosis: (1) There must be genetic diversity between the breeds crossed, and (2) there must be some non-additive gene effects present for the particular trait involved. The failure of either one of these conditions being fulfilled for a particular cross for some trait would result in that trait exhibiting no heterosis. In such a case, the expected performance of the crossbred's offspring would simply be the average of the performance levels of the particular straightbred parents involved in the cross.

For those traits that express heterosis, the magnitude of heterosis will be dependent upon how much genetic diversity exists between the two parent breeds. Genetic diversity refers to the degree of genetic similarity or dissimilarity that exists between the two breeds. Breeds that have similar origins and that have been subjected to similar types of selection pressure during their development will be expected to be much more alike genetically (small amount of genetic diversity) than would breeds that have quite different origins and have been selected for different purposes during their development.

Therefore, to fully capitalise on increased productivity due to heterosis, it is necessary to remake the crosses among straightbreds each generation.

Practical Use of Crossbreeding

Crossbreeding is a system of mating that provides the commercial producer the opportunity of increasing total production of beef per cow in the breeding herd. Crossbreeding is not a substitute for good management, nor is it a panaceal for unproductive cattle. If anything, a good crossbreeding system will probably require a higher level of management in order to reap maximum benefits. The producer will need to be alert for possible changes in the herd's nutritional program as his herd becomes populated with more productive cattle. Some producers expect crossbreeding to do more than it really can. The same basic breeding principles should be applied to the selection of breeding animals for a crossbreeding system that would be used for a straightbreeding program. In both cases, use of genetically superior breeding stock will result in progeny with above average performance. In other words, once the decision has been made as to which breeds to involve in the crossbreeding program, the producer should select the best animals available from within these breeds.

Crossing the three most common British beef breeds would combine the desired characteristics of Angus, Hereford and Shorthorn, but the main benefits would appear with the cumulative effects of heterosis on fertility, maternal ability and growth rates. A three breed cross will yield more production than a two breed cross. Heterosis is also slightly greater between Hereford-Angus and Hereford-Shorthorn crosses than Angus-Shorthorn crosses, suggesting a greater similarity in genetic makeup between the Angus and Shorthorn breeds than the Hereford

Sexual Maturity

Studies have shown that bulling heifers should be around 65%of the mature weight at service. For a 580 – 630kg cow mature weight this equates to 380 – 410kg at bulling. Calving at two years old would require a lifetime Daily Liveweight Gain (DLWG) of 0.70kg to 0.80kg/day.

A Monitor Farm exercise explained the weight gain targets that a bulling heifer had to achieve to be a successful breeder in a Spring calving herd.

Period	DLWG	Target Weights and Gains
Birth Weight		30kg
Birth to Weaning	240 days @ 0.95kg	228kg
First Winter Housing	120 days @ 0.60kg	78kg
Turnout to Service	90 days @ 0.75kg	67kg
15 Month Weight at Service		**403kg**

(Source: SAC)

At it's first calving the heifer should weigh 85% of it's mature weight. To achieve these gains animals need plentiful supplies of feeding during their first summer, but these figures were found to be easily achievable. Further examination of data found that Hereford x Angus heifers weighed 20kg heavier than three-quarter bred Angus heifers at bulling, indicating some evidence of hybrid vigour.

Breeds differ in their performance attributes for maternal traits (important in breeding cows) and growth and carcass characteristics (important in finished cattle).

Breed has a dramatic effect on age at puberty in beef heifers. The range in age at puberty based on breed can be from 6 months to 18 or 20 months of age. With the goal to have heifers calve at 24 months, heifers need to be bred by 14 or 15 months of age. Furthermore, research indicates that heifers that have 2 or 3 cycles before the breeding season have increased pregnancy rates to the first service. Of the major breeds used worldwide, Gelbvieh and Tarentaise are the earliest to reach puberty; Angus, Hereford and Simmental intermediate; Charolais late, and Brangus very late. Even within a breed, there is considerable variation in age at puberty in different lines.

Summary of the relative age at puberty of cattle breeds

AGE AT PUBERTY	BREEDS
Very Early (< 9 mths)	Jersey
Early (9-12 mths)	Red Poll, South Devon, Tarentaise, Pinzgauer, Brown Swiss, Gelbvieh, Holstein
Moderate (12-14 mths)	Hereford, Angus, Devon, Simmental, Maine-Anjou
Late (14-16 mths)	Limousin, Charolais, Chianina, Brangus, Santa Gertrudis
Very Late (>16 mths)	Brahman, Sahiwal

Adapted from Maren et al., 1992

Crossbred heifers are younger at puberty than purebred heifers. Reproductive traits are lowly heritable, but there is considerable heterosis in reproductive traits. To improve reproductive efficiency in commercial herds producers should have a crossbred herd based on breeds that reach puberty by 12-14 months of age.

The biggest advantage in a two year old calving system is that the cow has entered productive life far sooner. There are other benefits from this practice with regards to mature size and longevity. Maternal breeds need to be selected to maximise the percentage of fertile bulling heifers, but early sexual maturity plays an important part in the rest of the cow's productive life. The biggest advantage is that the producer already has a saleable calf when it has produced it's second calf at the more common first calving age of three years.

Most UK dairy herds calf their replacement heifers at two years old, with dairy breeds reaching puberty up to 50 days earlier than some beef breeds. Clearly, puberty is not the only factor to be considered when deciding on which breeds to use as a suckler cow, and most dairy breeds have factors, such as conformation, that exclude them from being a truly successful suckler cow. However, some continental breeding does seem to limit the extent that the profitable effects of early sexual maturity can be maximised.

Southern hemisphere producers successfully use the early sexual maturity traits of Angus and Hereford to allow their breeding heifers to calve at two years old.

A big shift in attitude will be required in the UK when trying to convince buyers of replacements that the smaller, two year old calver, is a better buy than a bigger three year old calver. The younger heifer will obviously have more calves during it's productive life, cost less to keep due to it's size, and be more fertile as a result. It should be the better buy, the one that will make the most profit over it's lifetime, but the big is best brigade will take a bit of convincing!

Calving Ease

Following closely behind fertility as one of the major factors affecting profitability; calving ease has a huge impact on calf and sometimes cow, survivability. The majority of calf deaths occur within the first 24 hours following calving. The table below shows average figures for most of the breeds used in the UK today. Care should be taken when interpreting these figures, however, as there can be variations within breeds that can distort the rankings on this table. EBVs should, if available, be used to gauge the degree of calving ease for individual bulls.

Assisted Calvings and Calf Deaths out of Hereford x Friesian Cows (Source: MLC)

Breed of Sire	% Assisted Calvings	% Calf Deaths
Charolais	10.1	5.1
Simmental	9.7	4.7
South Devon	8.4	4.4
Limousin	7.9	4.9
Lincoln Red	6.0	3.5
Devon	6.1	3.2
Hereford	4.2	1.8
Angus	2.0	1.5

Crossbreeding has a big influence on calving ease. If the cow is, for example, an Angus Limousin cross and is mated to a Charolais or Simmental, three quarters of the calf's genetics are from breeds with poor calving performance. A Hereford Angus cross cow, in theory at least, should involve fewer assisted calvings.

The condition score of cows about to calf has an influence on the levels of dystocia encountered. It is well documented that continental type cows in high levels of body condition will experience calving difficulties, especially if they are in calf to a continental bull.

Weaning Weights

My own experience with weaning weights of Charolais calves from different crossbred dams has not thrown up any huge differences. The main emphasis of these findings is that the Native cross dams have sufficient milk to produce a quality calf with weaning weights comparable to continental bred dams.

The table below shows results from a monitor farm trial comparing the weaning weights from a batch of 50 Charolais cross steers from continental cross cows and Angus Hereford cows. All the calves in the trial were treated identically, being weaned at 7 months of age and had access to a creep feed for the two months before weaning

Charolais Cross Steers	Average Age at weaning	Average Weight (kg)	DLWG (kg/Day)	Calving %	Kg of calf weaned/100 cows to Bull
Continental Cross Dams	213	318	1.30	89	28,302
Black Baldie Dams	214	319	1.30	91	29,029

(Source: SAC / South West Monitor Farm)

This trial concluded that milk production is not the only factor to influence calf weaning weights. Angus Hereford cows, which appeared to have much smaller udders than their dairy bred counterparts, produced calf weaning weights of similar if not identical figures.

Due to a higher calving percentage, the Angus Hereford cows produced more kilos of calf per 100 cows mated, and it will be interesting to attempt the same type of trial with a native breed bull. Although weaning weights would be lower for native breed steers, the production of kg of weaned calf per 100 cows could be expected to be as good due to increased calving percentages and higher calf survivability.

Easy Finishing

The results below are from a group of Charolais cross heifers. They were all spring born, weaned in early December and fed on a ration of ad-lib silage and 2 kg of a 16% protein home mix through their first winter. All were turned out to grass in the following April and fed 2 kg of an 18% finishing mix for 3 weeks before housing in late September. Once housed, the mix was increased up to ad-lib feeding, and the first animals were sold early October. The last of the groups were sold in mid-December. It must be stressed that all the animals were treated identically throughout their lives.

Charolais Cross Heifers

Dam	Age at Slaughter (Days)	Deadweight (Kg)	£/Head
Black Baldie	531	307	686
Continental Cross	573	303	685

(Source: SAC / South West Monitor Farm)

Groups 1 and 2 achieved similar deadweights and sale prices, even though the dams in these two groups were quite different. The most significant difference is the age at slaughter with the Charolais heifers out of the Black Baldie dams finishing, on average, 40 days quicker than the continental cross cows calves.

Bearing in mind that the extra 40 days was not at grass, but on an indoor ad-lib cereal based diet, the extra feed used for the same return amounted to around 500kg for each animal. As expected, the main difference in performance between the two groups had come from foraging ability in the genetics of the calf's mother. The Black Baldies' easy fleshing at grass had carried over into the calf.

The continental cross cows were mostly sourced from dairy herds and had more available milk, but their calves still took 40 days longer to finish.

Longevity

Breed longevity has not been studied extensively, although I did find a Hungarian report that evaluated a database consisting of 2115 cows belonging to five breeds. Hungarian Grey (new one on me!), Hereford, Aberdeen Angus, Limousin, and Charolais. It also included two crossbred genotypes, Simmental x Hereford and Simmental x Limousin. The study concluded that Hereford crossbred and Hereford purebred cows had the longest productive life and Limousin cows the shortest.

One of the most difficult factors to evaluate is why certain breeds last longer than others. The reason for culling a particular cow very rarely comes down to one factor, and seldom is it old age. Fertility, milk production, disease and structural soundness play the biggest part in deciding whether a cow will see the bull the following year. Anecdotal evidence suggests that the Hereford Friesian was probably one of the longest living crossbred suckler cow types, but I am sure there are plenty of other breeders who will stick up for their own personal preference. Native breeds have been bred for the UK climate and, as such, will be more suited to a life in UK production systems.

Biosecurity

As many as 700 herds in the UK fail a TB test every year. Research has shown that the main cause of the spread of the disease is from the transport of infected cattle. Even with 7276 herds under movement restrictions on 31st March 2007, it is clear that TB is still a major threat to herd health across the UK. After visiting a number of closed herds that are continually being re-infected, despite having boundaries that are double fenced, it would appear that the government has still not found all sources of bovine TB.

Johnnes disease is also becoming more common in beef herds and has extremely damaging results in closed herds due to the rate at which the disease can replicate and infect from dam to daughter.

Producers need to either buy from known health status sources or breed their own replacements, only buying in bulls from known health status studs. Specialist suckler cow replacement breeders with a high health status can supply commercial producers with high quality breeding heifers. These should be Johnnes accredited, but also vaccinated for BVD and Leptospirosis as these diseases are common in most herds and unvaccinated naive heifers would be more likely to abort.

I would predict that this type of operation will become more common as alternative replacement sources become less suitable and demand will increase in the short term as pre 1996 cows are removed from breeding herds towards the end of 2008.

The cost of a herd breakdown from any disease is prohibitive and every effort should be made to minimise the risk of such an event.

The most effective method of improving herd biosecurity is to breed replacements within the herd. The only risk involved is the health status of the bull used for the breeding programme. Control of the genetics being used and the ability to breed out some of the problems within the existing herd, for example lack of milk, are some of the side benefits of taking this option.

Complicated breeding and replacement breeding systems are probably the biggest reason for the fact that the owners of most suckler herds prefer to buy cows and heifers. Where it goes wrong is when there is no strategy.

Most farmers don't plan to fail, they just fail to plan

I came across this on a few of my visits as I travelled around the world. In every case where the operator did not have a strategy, the herd looked like a zoo with various breed experiments running about in one huge mob. I also must say that the biggest and most successful operations did not look attractive on the eye, but they did have planning and strategy, and were focused on profit.

Whether a producer decides to breed his own replacements or buy in, preferably from a single source or at least a single type, he or she needs to plan to succeed.

What is the Gain From a British Native Breed Maternal Cow?

It could be argued that any herd using any breed or cross could adopt the previously mentioned management strategies and maximise its profit. The main point to make is that these targets are ***easily*** achievable using British native breeds as the maternal cow.

	Increase in Profit or Cost Saving/Cow (£)
Increase Herd Fertility by 4%	18 - 20
Improve Cow Longevity by 1 – 4 Years	18 - 40
Improve Calves Weaned by 4%	20
Easy Fleshing at Finishing/Temperament	50
Reduce Overwintering Feed Requirement	15 - 20
Outwinter Cows	40
Labour (Less Assists and Caesareans)	10
Total/Cow	**171 - 200**

Source: Adapted from SAC Perth

Future Developments that will favour British Native Breeds

Queensland Water Hole

Climate Change / Fodder shortages

Climate change is going to happen whether we can agree on the reasons for its cause or not. Certainly, southern parts of the UK are going to suffer more from the phenomena than more northerly areas, but increases in temperature with associated fodder shortages will occur. Producers in the southern hemisphere have used British native breeds to overcome the effects of heat and drought and still return a profit. They have used the easy fleshing abilities of the breeds to put on condition quickly when there is fodder and let them survive on body fat when feed is scarce, using these attributes to be productive and profitable.

In short, a native breed cow will be more able to handle anything you throw at it and survive, whether it is outwintering or summer drought.

Grading Developments

The current UK grading system, based on the EUROP grid, has been used for the last 15 years by processors, and has favoured animals with shape. This system is purely subjective, does not involve any objective measurements, but, most importantly, does not reward a producer for producing what the consumer wants; eating quality. The grid is solely based on red meat yield and does not take into account eatability factors such as tenderness, juiciness or taste. Since its introduction the EUROP grid has improved the conformation of cattle presented at abattoirs which, to be fair, at the time native breeds lacked.

It is time that the producers focused more on the consumer instead of the processor, but to do this successfully and profitably another grading system, measuring meat quality, will have to be adopted.

To discuss all the available systems on the market today would take another Nuffield Report, and they have been studied in the past. There are two that I feel should be briefly mentioned, and I did see them being used in practice.

MSA

Meat and Livestock Australia has been using the Meat Standards Australia (MSA) system since 1997. MSA is a beef and sheepmeat eating quality programme that labels beef and sheepmeat with a guaranteed grade and recommended cooking method to identify eating quality according to consumer's perceptions.

Over 60,000 consumers have participated in MSA consumer testing, providing scores on 420,700 beef samples from 42,070 individual cuts to establish the standards.

All participants in the programme are licensed to use the Trade Mark, and certify products via an approved Quality Management System in accordance with the MSA Standards Manual.

Licensees are subject to independent annual random audit programmes for compliance to the standards. DNA samples are taken from every carcass graded to enable traceback at time of purchase.

Meat is sold by processors on a star system with four grades guaranteeing eating quality:

Ungraded
3-star (Tenderness Guaranteed)
4-star (Premium Tenderness)
5-star (Supreme Tenderness)

With the widespread use of *bos indicus* breeds and their crosses, and their renowned poor eating quality, the Australian industry was forced to develop a system to measure eating quality. *Bos taurus* breeds, such as British and continental types, have less variation between breeds on eating quality.

The system is mainly used by wholesalers, and does not really get through to consumers, but it does encourage the processors to treat meat correctly after the kill, and guarantees standards of eating quality if cooked when a recommended method of cooking is used.

Genetic indicators are used to determine taste traits, such as marbling, with Angus and Hereford being best. As with all cattle, management practices that result in cattle being heavier and fatter at a younger age will improve grading results.

Consequently, producers are paid depending on the star grade their animals achieve, and store producers receive a premium from finishers that have previously been successful with their cattle. The system encourages producers to breed cattle that give the consumer what they want; eating quality.

The MSA system would encourage breeders, finishers and processors in the UK to concentrate on producing top quality beef together, accurately measure the standards they achieve, and reward the top grades accordingly. Pre and post slaughter problems that affect taste such as diet, stress, poor handling and incorrect hanging times could be identified and minimised to ensure the consumer receives a uniform premium product at a premium price.

I think it is more than just sheer coincidence that the three countries I visited, that all concentrate on what the consumer wants, had beef consumption levels per capita over twice that of the UK.

VIA

Visual Image Analysis has been used in Ireland for a couple of years and measures the carcass using 3D images and a computer programme to calculate the exact meat yield and the percentage of different cuts. Interestingly, the original machines were calibrated against the subjective measurements of graders, which are only 60% accurate. There have been problems with equipment in the past, mainly the inability to work at line speed, but the technology would improve quickly if the industry were to adopt it. VIA would take out the subjective guesswork of the EUROP grid and pay farmers exactly for what they produce.

These are only two of the most promising examples of the technology available to the meat industry. I see no incentive for producers to breed eating quality and meat yield into their animals if they are not being properly rewarded for a quality product in a system that cannot differentiate between shape and taste. The first step in the right direction is to identify animals that reach the highest demands of wholesalers, and ensure that the meat they sell at a premium to top customers is the quality it should be. Subjective measurements should have no place in premium brand products such as Scotch beef. The science is available and we should implement it now.

Cereal Prices/Boifuel Production

Cereal prices have already risen in anticipation of the government's decision to increase biofuel production. Once these plants are online, who knows what the cost of finishing cattle on a cereal based ration is going to be? Certainly, with the majority of plants being built on the coast, a proportion of the raw material will be shipped from abroad and there is undoubtedly going to be more by-products available (such as dark grains), but these still need to be transported to the finishing unit.

My own strategy on the west coast of Scotland is to switch to a grass based finishing system and use the foraging ability of Angus and Hereford cattle to produce beef mainly off grass. A small amount of cereal will be used to put finish on before slaughter.

Early Weaning

This was a management tool that I first encountered in Argentina. It was being used for a number of reasons and was very effective in different situations. I first saw it being used on a large scale where there was a grass shortage three months after calving and the producer had weaned the calves before the cows were mated with the bull. The fodder shortage would surely have prevented the majority of his cows from being fertile, but as soon as the calves were weaned ovulation would follow, especially if they were not feeding the calf. This technique was mainly being used to get the cow back in calf.

In Australia many producers regard feeding the cow to produce milk to feed the calf as an inefficient use of valuable and sometimes scarce grass. The method was to wean the calf at around 5 months once the cow had been serviced, offering the best pasture to the newly weaned calf and continuing with a creep feed. The cows would then be given the poorer quality grazing and would continue through their dry period. A side effect of this practice is that the early weaned calf's digestive system develops earlier, because of the introduction of creep feed and the absence of milk in its diet. Furthermore, it has led to improved performance in subsequent finishing systems.

Obviously, these options are more applicable to native breeds that are more suitable to forage based systems, but I see no reason why they would not work effectively in UK conditions.

As the subsidised disposal for cows born pre August 1996 ends in December 2008, these older cows could be weaned at 5 months and disposed of mid summer with little effect on calf performance. Indeed, younger cows earmarked for culling could gain condition at grass quite easily if weaned early enough, instead of fattening them on an expensive winter ration.

Conclusions and Recommendations

Beef Producers

- Focus on profit, not production. With no direct subsidy the biggest limiting factor to cow profitability is the fact that she has to have a live calf. This has to be top of the list on breed selection for bulls and cows.

- Use maternal native breeds only in suckler cow genetics. The main benefits are fertility, early sexual maturity, longevity, lower feed requirement and temperament. Continental breeds used as terminal sires over these cows will produce high conformation calves. Native breed sires will provide high eating quality steers, and heifer replacements.

- Buy breeding stock that has not been overfed for show. Southern hemisphere producers buy from on-farm sales, and animals that are ready for work. Bulls that have not been pushed will work harder and last longer.

- Wean spring calving cast cows early. Calf performance will not be impaired and the cow can be profitably fattened on grass instead of concentrate. This will also avoid the inevitable backlog at the end of the OCDS in December 2008.

- Develop a strategy for replacements. Dairy genetics have become extreme. Beef calves from the dairy herd will never be truly successful suckler cows.

- A heifer should enter productive life as a two year old. It is uneconomic to wait for three years, and it's performance as a cow will be inferior. This can be achieved with some breeds, but will be most successful using native breeds.

- Improve biosecurity through breeding replacements or buying from an accredited herd. A herd breakdown can be a costly mistake. Most producers believe that native breeds do not have enough milk. This is not the case. Home produced native breed heifers will make profitable suckler cows.

- Concentrate on producing tender, tasty beef for the consumer. Conformation should not be the main aim in suckled calf production.

Breed Societies

- Breed societies should not lose sight of the main attributes of native breeds. Easy calving, temperament, fertility and structural soundness, for example, are traits that should not be lost in the quest to compete alongside continental breeds for a slice of the terminal sire market. Suckler producers are becoming aware of the need for a maternal bull.

- Luing and Shorthorn breed societies have been very successful at promoting their breeds as maternal, and are now making a comeback in numbers as beef producers look for an alternative for the dairy bred heifer. The show ring should include classes for maternal type bulls with an emphasis on EBV figures for maternal traits.

- On farm sales have many advantages for the seller and the buyer. The best bull in the herd will always make the top price, marketing expenses are reduced, and there is a chance to connect with your buyers. On-farm sales are the most common method of buying stock bulls in Australia and South America.

- The Commercial farmer that buys the bull should be treated as the consumer. Breeders should stop feeding for show and sell animals that are ready for work.

The Industry

- Adopt grading systems that reward eating quality, not shape. How are producers and processors meant to improve their product if there is no measurement of taste? Beef from any production system, including dairy, can be improved if treated correctly. The Australian MSA system is available and we should adopt it now.

- Producers must be rewarded for beef with superior eating quality.

- New standards should target markets that want guaranteed eating quality with a guaranteed product.

- Beef produced in other countries using methods outlawed in the UK should not be sold in the UK. However, I have no doubt that this approach will strengthen the resolve of the main players and will force these countries to adopt UK Farm Assurance and traceability standards. New eating quality standards would be the next logical step to differentiate our product.

- Improve co-operation among breeders, producers and finishers. Large-scale farming is not going to happen in the UK, the price of land will be the main limiting factor. This is the next best thing.

- Raise quality standards, but get rid of the red tape. Too much time is spent in the office with traceability paperwork. We should implement a completely electronic tracing system and be another step ahead of our competitors. The removal of the monetary and environmental cost of the chequebook passport system would benefit the industry.

- Scotch Specially Selected should be a premium, not a generic brand. Scotch beef is held in high esteem worldwide and it is time for further development. We cannot compete as commodity beef. We need to be in a “large scale niche’ market” with a premium brand on a premium product.

My Own Strategy

My Nuffield Scholarship trip has confirmed that in terms of profitability and consumer awareness, beef production in the southern hemisphere is 5–10 years ahead of the UK.

My own strategy at Drumdow has subsequently developed as a result of my studies. After 20 years of using Charolais bulls to cross with bought in replacements, I will not use any continental bulls for the forseeable future. I had already closed the herd last year and started breeding my own replacements, and I am now convinced that the maternal cow is the only profitable way forward.

I now need to concentrate on a more compact calving period to ensure that replacement heifers are big enough to bull at 15 months. To select the most fertile heifers I intend to limit their bulling period to just 8 weeks. This will ensure fertility in any subsequent heifer calves kept for breeding. Anything not in calf can still be sold deadweight off grass at around 20 months. A realistic bulling period target for the cows will be 10 weeks. This year all of the cows have calved in 11 weeks from a bulling period of 12 weeks.

Premium markets are available for Angus sired heifers and steers, but with Dovecote Park being the only outlet for Hereford sired calves, some negotiations will need to take place on a suitable price for my premium product from nearby abattoirs.

This year 55 Black Baldies calved to the last of my Charolais bulls with little intervention apart from a few malpresentations. Some calves had to be taught to suck, but that is Charolais. The biggest revelation were the 90 Limousin and Angus cross cows that calved to Hereford bulls, with practically no intervention required and fantastic calf vigour. It has been one of the easiest calvings I can remember.

Obviously the downside is that I am not going to top the store markets without my Charolais steers, but once all the other factors are taken into account I can see net farm profit increasing. The new market of selling high health status breeding heifers looks appealing and I intend to sell all these privately.

I used to show visitors my top class Charolais steers, now I am extremely proud of my Black Baldie cows.

Consumption of beef per capita in Argentina, Uruguay and Australia is amongst the highest in the world. The industry delivers beef of consistently high eating quality using proven scientific methods from breeds that deliver on taste and profit. If the UK suckler industry is to survive in a world beef market it needs to adopt some of the production strategies of the worlds best beef producing nations. The first step is to use a native breed suckler cow. A Maternal Cow.

“Breed a Cow, Not a Calf”

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