Genetics are the key to long term profitability

by Andrew J. Taylor, BA, VetMB, MRCVS, Chairman, British Livestock Genetics Consortium.

For maximum productivity, there must be a combination of good management and good genetics.

Even with the best management in the world, if the wrong breed has been chosen, the farmer will spend all his time working for his cows, to keep them healthy and productive. But choose the right breed for the local circumstances and his cows will be profitable and work to keep him.

A healthy Jersey cow.

In countries where dairy farmers need to make substantial improvements to the genetic quality of their local cattle, they have two choices:

- Import pure-bred Western breeds of the Bos taurus type, either as live animals or as embryos.
- Improve the local Bos indicus breeds by structured crossbreeding programmes using imported semen.

In countries with adverse climatic conditions, many pure bred Western breeds fail to thrive and the best results are obtained by crossbreeding.

Benefits of crossbreeding

Crossbreeding allows the opportunity to mix imported breeds with local cattle breeds to create cattle that are better than their parent local breeds and is one of the most effective low-input, high-output management practices that a cattle producer can adopt.

It offers two primary advantages, heterosis (also called hybrid vigour) and the opportunity for breed complementarity.

Heterosis

Some cross breeding programmes offer a greater degree of heterosis than others and some traits respond better than others.

The more diverse the parent breeds, the greater the heterosis will be. The best example of this is mixing of Bos taurus and Bos indicus breeds, since these breeds actually represent different species. Like any other management technique, crossbreeding must be done properly for the full benefits to be seen and it is essential to choose the Bos taurus breeds that will offer the best complementarity with the local Bos indicus breeds.

Effective crossbreeding is more than simply purchasing a bull of a different breed to the last one that was used. It is vital that the crossbreeding programme is properly planned, choosing the right mix of breeds to blend together to suit the local circumstances.

Jersey cattle

Jersey cattle share a common ancestry with those cattle found on the Normandy and Brittany coasts of France that originated from the Middle East. This explains why the Jersey breed is particularly robust and very adaptable to hot climates. It is found all over the world and is generally regarded as the ideal breed to use as the first cross on local Bos indicus cattle in a structured crossbreeding programme.

The Jersey cow is relatively small in size, averaging 400-450kg in weight. It is typically light brown in colour and extremely dairy like in type. Its hard black feet are much less prone to lameness, it will calve easily and it is excellent for crossbreeding.

Jersey milk is noted for its high quality, being particularly rich in protein, minerals and trace elements. It is also rich in colour, which is naturally produced from carotene, an extract from grasses and forage. The national breed average in the UK in 2007 was 5,618kg milk at 5.38% fat and 3.84% protein.

Holsteins

The predominant dairy breed in the UK, as in the rest of the world, is the black and white Holstein. It is the highest yielding breed, the breed average in the UK in 2007 being 8,705kg milk at 3.92% fat and 3.19% protein. The breeding policy in the UK has been highly focused on improving health, welfare and longevity through the introduction of traits such as locomotion and condition score.

In the UK, Holstein cows average 3.2 lactations per cow, compared to less than 2.0 in the USA.

British Friesians

If a black and white breed is the first choice, there is an alternative to the Holstein in the British Friesian. Friesians were first imported into the UK from North Holland during the 1800s and development of the breed by selective breeding over the last 100 years has successfully established the British Friesian breed as the second largest dairy breed numerically in the UK.

The modern British Friesian is basically a grazing animal, able to sustain itself over many lactations on either low-lying or upland grassland. It is a breed that is very robust, easy to manage, with good fertility and high longevity.

These attributes make it an ideal breed for developing livestock industries in countries where there is limited expertise in dairy management and whose climates demand robust cattle. British Friesian genetics are widely exported to countries with grass-based systems of milk production and where its adaptability to hotter climates is required.

The British Friesian is first and foremost a dairy breed, giving high lifetime yields of

Continued on page 14

Continued from page 13
quality milk from home produced feed. Yields can be well in excess of 8,000kg per lactation with the UK breed average in 2007 of 6,761kg per cow. The milk has a high yield of butterfat and protein, averaging 4.09% butterfat and 3.34% protein.

In addition, surplus male animals are highly regarded as producers of high quality lean meat.

Ayrshire

A differently coloured alternative to the British Friesian is the Ayrshire. Originating in the South West of Scotland some 200 years ago, the reputation of the Ayrshire breed spread worldwide and many top quality animals were exported around the world to form new populations and improve local breeds.

It is now an international breed found on all five continents, and its ability to thrive in climatic extremes makes it the ideal cow for climates varying from the heat of Africa to the cold of a Scandinavian winter. This medium sized cow can be any shade or blend of red-brown and white and is noted for her balanced conformation, strong udder formation and good movement from sound feet and correct leg settings.

The Ayrshire is the ultimate economic dairy cow, characterised by high quality milk, longevity, ease of management, high fertility and overall good health. Renowned for its foraging ability, the breed readily adapts to differing levels of feed and management.

Top herds average over 10,000kg of milk per lactation, with the breed average in the UK in 2007 at 6,873kg per cow.

The milk has a high yield of butterfat and protein, averaging 4.06% fat and 3.32% protein in 2007, which contributes to its taste and is popular with milk processors.

Montbeliarde

An alternative to the Ayrshire is the Montbeliarde, another red-coated breed. It is a robust breed that originates from the high plateaux of the Jura mountain range in France. The breed has acquired an enviable reputation for producing milk to make some of France's greatest cheeses, along with high quality beef.

The milk is high in protein with 50% of the females carrying the Kappa Casein 'B' gene, which is much sought after by cheese makers. The milk also contains high levels of conjugated linoleic acid (CLA), a naturally occurring trans-fat that has substantial benefits for human health. In the UK, the breed average in 2007 was 7,073kg milk per cow at 3.90% fat and 3.34% protein, with individual cows achieving yields in excess of 10,000kg. The popularity of this versatile breed is growing around the world.

Many large herd owners in the USA are now using Montbeliarde genetics to combat an unacceptable decline in herd fertility and longevity.

Guernsey

The breed was developed on the British Island of Guernsey, based on historic importations of various French breeds. The Guernsey cow is of medium size with mature animals weighing between 500 and 600kg. She is known for her ease of calving, even when bred to large breeds with extreme muscling such as the Belgian Blue or Charolais. She has good feet and leg structure and has the highest longevity of all the UK dairy breeds.

The Guernsey also has excellent temperament and adaptability and is well suited to extensive farming situations.

The Guernsey breed is renowned for the quality of the milk produced, with a national breed average in 2007 of 4.62% fat and 3.56% protein from a yield of 5,603kg milk.

The Guernsey cow has a unique ability to pass Beta carotene and Beta casein A2 into her milk, which not only leads to a rich golden colour in milk and resulting products but also has positive implications for human health.

Which is the right breed?

There is no single correct answer to that question. In Thailand, for example, farmers have been using Holstein semen to upgrade their local cattle. However, milk yields have been disappointing, infertility problems are increasing and it is now planned to use British Friesian genetics instead.

In India, the local Red Sindhi cattle are inseminated with Jersey semen and then Holstein semen is used on the resultant cross-bred.

On the other hand, in Vietnam, the local cattle have first been crossed with Red Sindhi semen, with Holstein semen used to create second and third crosses. Some farmers are now following the example of Indian dairy farmers and using Jersey as the first cross.

It is clear therefore that the right breed is the breed, or combination of breeds, that best suits the local circumstances. That choice must take into consideration the climate, the availability of feedstuffs and not least the management skills of the local farmers.

What is certain is that if the wrong choice is made, it can lead to great disappointment, with the farmer spending all his time working for his cows, to keep them healthy and productive. But choose the right breed for the local circumstances and his cows will be profitable and work to keep him. ■