

Get a Free Lunch - on Herefords

Article: Hybrid Vigour

By Dave Warburton.

The basic knowledge about hybrid vigour or “heterosis” as it is more correctly known as has been around for over 50 years.

The term describes the estimated difference between the average performance of the reciprocal crosses of two breeds and the average performance of their two parental breeds.

There are two forms of heterosis: individual heterosis – the effects of crossing two or more breeds on the calf and maternal heterosis – the effects of a crossbred cow on her own performance and her calf.

The crossbred cow is without doubt the best cow around for performance.

The most commonly known attributes of the crossbred calf over a straightbred include

- superior growth rates
- superior fertility

Recently there have been a couple of new large scale studies that have identified other significant factors.

Did you know that the crossbred cow lives longer? She therefore produces more calves and therefore produces more kg weaned/cow.

Trait	Breed Group			
	Hereford	Angus	HA	AH
Longevity	8.4yrs	9.4yrs	11yrs	10.6yrs
No' of calves	5.9	6.6	7.6	7.6
Weight weaned (kg)	1093	1290	1481	1597

If commodity value was \$2.10/kg for a Hereford cross weaner then the cow produces \$3110.7-\$3353.7 of weaner product.

Given the above total lifetime weaner weight weaned of an Angus cow, the weaner would have to attract a premium of \$2.41-2.60/kg (these prices are, it's fair to say, uncommon). If the weaner sale fair prices are even stronger then it is even tougher for the straightbred to achieve sufficient premium to match the crossbred weaner.

Did you also know that the Hereford is one of the best breeds to use in a crossbreeding programme? It has recently been discovered that because the Hereford is a long established breed that is more homozygous than most (bred from a narrow based population with the least number of other breeds introduced into the population) when you do use it in a cross

breeding programme, the heterozygosity achieved is significantly better than other breeds. This homozygosity has shown up in the genomics program when searching for DNA markers.

Hybrid Vigour has its biggest impact on the traits that are lowly heritable and therefore slow to progress in a straightbred herd. These include fertility, longevity and health.

There is also studies out there to suggest that morbidity (number of animals affected by disease, and mortality (animal deaths) is decreased in a crossbred animal.

With the superior fertility of a cross bred female not only does she reach puberty earlier, making her ideal for yearling heifer mating, she also has a higher pregnancy rate throughout her life meaning significantly less replacements are required and an improved efficiency of the herd.

Early results from two studies in USA both show a significantly increased pregnancy rate of 7% in the Hereford Angus x female heifer compared to the straightbred Angus heifer. The ongoing effects of the maternal heterosis are being measured in the studies as the cows get older to show an accurate long term effect of the crossbred cows productivity.

President of the New Zealand Hereford Association Geof Brown of Locharburn Herefords, near Cromwell says there are a lot of black herds on NZ hill country and he says when those cows are joined with a Hereford bull the beef farmer is the recipient of a free lunch thanks to the influence of Hereford genetics.

“A Hereford bull for use over black cows must be the bull of choice for NZ farmers in coming years to realise the full potential of their beef herd.”

“Using a Hereford bull over black cows will give them the best of both breeds”

The benefits for NZ farmers don't stop at hybrid vigour. These cattle are eligible for the award winning Hereford Prime branded beef programme, Steak of Origin winner of the best branded Beef title in 2009 and proudly supplying the top end of New Zealand's restaurant market.

To read more on the research hybrid vigour research project in the United States visit: http://hereford.org/static/files/newsletters/TheWhiteface0809_LR.pdf

** Dave Warburton is a practicing veterinarian and a registered Hereford breeder.*

Article: Hybrid Vigour – A forgotten tool with no peer

By Dave Warburton.

A high performing herd has 3 Key Performance Indicators to measure the success of the herd.

1. Pregnancy rates

2. Growth rates

3. Calf survival to weaning

A high performing cow herd can be a highly profitable herd and the biggest driver of profitability is calving rates. No live calf equals cost.

The higher the calving rates, the lower the replacement rate and the higher the number of surplus saleable females. This means it costs less to maintain the performance and size of the herd.

There is nothing new about this, it isn't rocket science, but perhaps we have forgotten how big a part hybrid vigour has, in reaching the goal of a high performing and profitable cow herd.

What does hybrid vigour give you?

Two large scale studies in the USA have just been completed.

In California at Lacey Livestock, 10 Hereford and 10 Angus bulls with similar EBVs for their respective breeds, were randomly mated to 400 mature Angus based cows in year 1. In year 2 and 3, 15 bulls of each breed were mated to 600 cows. Calves were DNA sampled to confirm parentage.

The cattle were managed in extensive rangeland conditions. The steers entered the feedlot at the appropriate times and identical rations were offered to all cattle for an average of 155 days. The heifer pregnancy rates were also measured when mated as yearlings.

The Findings:

There was a 3% increase in weaning weight for Hereford sired calves.

There was a 5% improvement in feed conversion for the Hereford sired calves in the feedlot.

There were minor differences in sickness and treatment rates between the two groups.

There were minor differences in carcase weight, dressing percent, and yield grade.

There was a significant advantage in marbling score to the Angus straight bred.

The Financial Outcomes:

Given the increased growth rates, their lower cost of gain, and despite their lower marbling scores, there was still a significant advantage to Hereford sired steers of US\$15/hd. In New Zealand where marbling is not as valued the advantage is even more significant (approximately double the margin).

But, the financial advantages don't stop there.

The yearling heifers when mated by AI showed an increase of 7% in pregnancy rates 93%-86% in the two years studied over the Angus straightbreds.

In another Heterosis project undertaken at the Circle A Ranch in Missouri, a very similar study design found very similar results in the growth rates, pregnancy rates and slaughter measurements to the California study.

However they also developed a financial model of the benefits of heterosis in the cow herd (maternal heterosis).

There were significant benefits from the increased pregnancy rates, such that after 10 years, if cull rates for both breeds were kept constant, the Hereford sired herd would have grown to be 20% larger than the Angus straightbred herd.

The Hereford sired herd advantage over a 10 year period would have resulted in an advantage of US\$514/cow net value.

What are the implications for the NZ commercial cow farmer?

1. Hybrid vigour is a consistent effect.
2. Direct heterosis (a Hereford crossbred calf) will produce improved. weaning weights and improved feed conversion.
3. Maternal heterosis (Hereford crossbred cow producing crossbred calf) yields improved pregnancy rates, even faster calf growth rates and will produce more calves in her lifetime.
4. The improved feed conversion decreases the costs of herd maintenance and feed required to finish the progeny.
5. Crossbreeding produces improved fertility and could be utilized as a method of rebuilding cow herds internally at a significantly quicker rate than a straightbred.

A reminder of the effect of number of calves surviving to weaning:-

Herefordcow	5.9calves/lifetime	1093kg total
Angus cow	6.6calves/lifetime	1290kg total
Angus/Hereford cow	7.6calves/lifetime	1481-1597kg total

That's an advantage of between 191-307kg total per cow lifetime.

In a 100 cow herd that is an advantage of 19.1-30.7tonne of calf liveweight over the 7.6 years.

At a constant \$/kg liveweight at the weaner sales of US\$2.20(mixed sex price) this equates to a financial advantage of US\$42,020-\$67,500 over the 7.6 years, a handy addition to the farm budget.

There is currently no premium for straightbred mixed sex calves that will get close to these figures.

Note: This net profit doesn't include the improved feed conversion or the difference in purchase price between the Hereford and Angus bulls.

** Dave Warburton is a practicing veterinarian and a registered Hereford breeder.*http://beefdata.co.nz/gallery/cms/images_db/8f_dvh6_impact-of-crossbreeding-report.pdf