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Beef + Lamb New Zealand Dairy Beef Integration Project: Final Report

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September 2016

Report for Beef + Lamb New Zealand Ltd
Client report number: 5345

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CONTENTS

1. EXECUTIVE SUMMARY

The beef industry is becoming increasingly reliant on calves sourced from dairy farms, but the sires of these calves are often of poor or unknown genetic potential for beef production. The Beef + Lamb New Zealand Dairy Beef Integration Project aimed to demonstrate the use of quality beef genetics in a dairy beef supply chain and the impacts on mating, calving, calf rearing and beef finishing. This was achieved by using Ezicalve Hereford sires, which have high estimated breeding values (EBVs) for calving ease and growth, and comparing the performance of their offspring with calves sired by unrecorded Hereford bulls.

Low breeding worth (BW) cows at the AgResearch Tokanui dairy farm were inseminated with Ezicalve Hereford semen over 6 weeks. This was followed with 4 to 5 weeks of natural mating of the dairy herd with a mixture of Ezicalve Hereford sires and unrecorded Hereford sires. The offspring born in 2012 and 2013 were reared at Tokanui then transferred to AgResearch Whatawhata hill country farm for finishing, where they were monitored until slaughter between spring 2014 and autumn 2016.

Using beef sires during AI (artificial insemination) required little input time to plan and did not increase farm labour requirements during mating. The cost of beef semen was also 20% lower than the cost of Premier Sires dairy semen. The cost of using recorded versus unrecorded beef bulls during mating depends on the bulls purchased.

There were no assisted calvings for Ezicalve AI sired calves in either year. One Ezicalve naturally sired calf required assistance for a breech birth, but this was not related to sire genetics. For the calves sired by unrecorded Hereford bulls, 4% and 2% required calving assistance for 2012 and 2013, respectively. Ezicalve Hereford AI sired calves averaged 3.5 to 4 kg lighter than the unrecorded Hereford sired calves at birth. The calves naturally sired by Ezicalve bulls were lighter than those sired naturally by unrecorded Hereford bulls in 2012, but of similar birth weight in 2013.

There was no difference across sire types in the time for their calves to reach 100 kg live weight, live weight gain during finishing or revenue received per day on the finishing farm, indicating the lower birth weight Ezicalve sired calves were of equal value to the calf rearer and beef finisher as the larger calves sired by unrecorded bulls.

Selecting bulls with high growth EBVs showed an advantage during beef finishing. Within Ezicalve sires, the sire with the highest 600 day growth EBV had a live weight gain advantage of 0.03 to 0.04 kg/day during finishing and a revenue advantage of 18 cents per day ($85 total per heifer, $122 total per steer), respectively over other Ezicalve sires. This was more than double the advantage than when comparing black- with red-coated cattle.

Cows inseminated with beef semen were selected on the basis of cow BW, but this did not impact the performance of their progeny during rearing or finishing. Similarly, other dam traits such as proportion of Friesian genetics, age, live weight and frame size had little impact on their progeny’s performance from birth to finishing. Age, sex and date of slaughter had more impact on carcass traits than sire genetics or dam traits.

This programme has shown that using beef sires with high EBVs for calving ease and growth on dairy farms can provide benefits for both the dairy and beef industries.

2. BACKGROUND

Two thirds of NZ's beef kill originates from the dairy industry. Dairy farmers therefore make the most critical decisions about the genetics of most of the cattle entering the NZ beef industry, yet they are largely indifferent to the needs of the beef industry. About 20% of dairy progeny are "sired" by beef-type bulls, with the majority of these unrecorded sires. Therefore, the performance of dairy sourced cattle for beef finishing is variable. With there now being approximately 5 times more dairy than beef cows, there is an increasing requirement for the supply of quality beef via the dairy industry.

Calving ease was identified as one of the major barriers to adoption of the use of beef semen by dairy farmers (Oliver & McDermott 2005). However, proven sires are available that have good estimated breeding values (EBVs) for calving ease as well as growth. Use of such sires in the dairy industry by both artificial insemination (AI) and natural mating has the potential to benefit dairy farmers through reduced calving problems, calf rearers through potentially better growth and a more valuable calf, beef finishers through better growth and beef processors for a greater supply of high quality beef.

Further, many beef-cross calves become available late in the season, because they are largely from cows naturally mated to a beef-breed bull at the end of the breeding season. Use of proven sires during AI will produce a calf earlier in the season with a greater potential for them to be finished before their second winter, making them more attractive to calf rearers and beef finishers.

The Beef + Lamb New Zealand Dairy Beef Integration Project aimed to demonstrate to dairy farmers and the beef industry the potential value to the entire dairy beef supply chain of using quality beef sires in the dairy industry. It monitored the performance of a dairy beef supply chain through AgResearch farms in the Waikato, from mating of dairy cows with beef sires to finishing of dairy beef cattle. Ezicalve Hereford sires were used during AI and natural mating and the performance of their offspring compared to cattle sired by unrecorded Hereford bulls. Ezicalve sires were used because of their high EBVs for calving ease and live weight. This final report documents the animal performance and impacts throughout the supply chain.

3. METHODS

A dairy beef supply chain was set up on AgResearch farms, with the mating of a selection of the dairy herd with a mixture of Ezicalve and unrecorded Hereford bulls in spring 2011 and 2012. The impacts on mating were recorded for each of these years and calves born in 2012 and 2013 were tracked from birth through calf rearing and finishing.

3.1 Mating

The dairy farm for this supply chain was the AgResearch Tokanui dairy farm, located south of Te Awamutu. The herd comprised 700 to 860 spring-calving Friesian and Friesian-Jersey cross cows across the years of this project. Some aspects of decision making and farm management were different to that on a commercial dairy farm, with the farm working within best management guidelines for the dairy industry, whilst also meeting research needs. Cow liveweight was measured in the first week of December (average across the week) in the year of mating, and frame size (measured by hip height) the following April.

The three sires used for artificial insemination (AI) were Ardo Caspian 6159, Koanui Rocket 0219 and Ardo Russia 4133. These bulls had calving ease EBVs in the top 1% for their breed. EBVs for all traits are detailed in Appendix 8.1. These sires were nominated across

235 and 256 cows in 2011 and 2012, respectively. In 2012, few straws of Ardo Russia 4133 were available, so the progeny of this sire were omitted from analyses for the second cohort of cattle. Sires were balanced across the cows for cow breed, age and live weight. The cows ranged from 50 to 100% Friesian parentage, with the remaining proportion being Jersey. Cows were selected for insemination with beef semen based on breeding worth (BW), with those deemed not suitable for breeding dairy replacements being inseminated with beef semen. Artificial insemination started between 7 and 11 October each year and continued for 6 weeks. Cows on heat were automatically drafted out each morning and a report of the cow numbers and nominated sire automatically produced.

Following AI, 25 to 29 Hereford bulls were run with all of the spring-calving cows for a further 4 to 5 weeks. These were a mixture of Ezicalve (Appendix 8.2 and 8.3) and unrecorded Hereford bulls. Bulls were rotated into and out of the herd every 3 to 4 days.

At the conclusion of mating, staff involved in mating management were interviewed to determine their overall impressions of using beef semen and proven beef sires. The steps involved in selecting cows available for tailored mating with beef semen were also recorded at this time.

3.2 Calving

During the 2012 and 2013 calving seasons, cows were observed 6 hourly during the night and more frequently during the day. All cows were scored for calving ease according to the MINDA dairy recording system. Scores were given as follows on degree of assistance:

1. No assistance given.
2. Minor assistance (pulled out by one person within 20 minutes).
3. Major assistance. The calf could not be pulled out within 20 minutes and veterinary assistance was required.

Still births and breech births were also recorded. Each day, new-born calves were weighed, with those removed from their dam after 5 pm weighed the following morning.

3.3 Calf rearing and vaccination

New-born calves were collected 6 hourly in 2012, navel-sprayed, transferred to the calf shed and navel-sprayed again. On arrival, calves were individually fed 2 litres of first-milking colostrum. In 2013, new-born calves were collected only at 11 am and 4 pm. New-born calves at the 10 pm and 5 am calving checks were navel-sprayed, administered 2 litres of first-milking colostrum then left with their dam until the morning calf collection. New-born calves were weighed daily after the 11 am collection.

In 2012, 106 AI Ezicalve sired and 80 naturally sired (57 unrecorded, 23 Ezicalve) calves were reared. In 2013, 99 AI Ezicalve sired and 69 naturally sired (24 unrecorded, 45 Ezicalve) calves were reared. For both years, approximately half of the calves reared were steers and half were heifers. Calves were grouped with up to 10 calves per pen of similar size and feeding ability (Figure 1). Colostrum was fed to calves for the first 4 days, then a mix of colostrum and calf milk replacer (CMR) for two days, then CMR for the remainder of the time.

In 2012, each calf was fed 4 litres milk per day for the first week, then 5 litres/day for the following two weeks then milk was gradually reduced to 2 litres per calf until weaning off CMR at 85 kg. In 2013 they were fed was 4 litres milk/calf per day for the first week, 5 litres/day for the second week, then 3.5 litres/day until weaning at 75 kg. All calves had continual access to fresh water. Hay was freely available for the first 5 to 6 weeks. Calves were fed a 20% protein meal with a coccidiostat added, *ad libitum* until weaning off milk, then the meal allowance was gradually reduced until calves reached 100 kg, at which stage they were transferred to AgResearch's Whatawhata hill country farm.

Calves were weighed individually on the day of birth then every one to two weeks and were transferred to pasture (Figure 2) between 3 and 9 weeks of age. Transfer timing was dependent on calf weight, weather conditions and space in the calf shed. Bull calves were castrated with a rubber ring at 5 to 8 weeks old. Calves were drenched for internal parasites every 4 weeks with Arrest C once outdoors and administered with Bayticol in October and November 2013 to treat ticks, as *Theileria* was detected in cows on the farm.

All calves were parentage verification tested (LIC) to identify their sire and dam. All calves were vaccinated against *Leptospirosis* and with Covexin 10 for protection against clostridial diseases. In 2012, Prolaject B_{12} injections were given on 8 November and 6 December, after tests showed low blood B_{12} concentrations. In 2013, B_{12}+selenium injections were given at 70 kg and before transfer to Whatawhata at 100 kg live weight.

Figure 1. Calf rearing in 2012.

Figure 2. Calves grazing pasture at AgResearch Tokanui, 2012.

3.4 Finishing

The cattle were grown and finished at AgResearch's Whatawhata hill country farm, 30 km from Hamilton. Calves were quarantine drenched on reaching 100 kg live weight, then transferred to Whatawahata, where they grazed on rolling to steep hill country pastures under the farm's normal management. Calves born in 2012 arrived between 11 November

2012 and 10 January 2013 and were separated into steer and heifer mobs in February 2013. Calves born in 2013 arrived between 1 November 2013 and 22 January 2014 and were separated into steer and heifer mobs in March 2014.

Pasture samples were collected every one to three months and analysed by near infrared spectroscopy (NIRS) for metabolisable energy, crude protein concentration, soluble carbohydrates and fibre by Eurofins laboratory, Hamilton.

Faecal egg counts were measured monthly from transfer until cattle were one year old. Calves were orally drenched 4 or 5 times after arrival at Whatawhata until approximately one year old, using Matrix C triple combination drench once calves were over the 120 kg threshold. Poor live weight gain following the 2014 drought prompted a further faecal egg count to be taken, and under veterinary advice, all 2012-born cattle received an injectable anthelmintic in July 2014. Under similar circumstances, all 2013-born cattle were treated in May 2015.

Lice treatment (Tempor™) was given in June each year and booster vaccinations for *Leptospirosis* and clostridial disease were given annually. In response to blood tests, 2012-born cattle received a 10 g copper bolus and Prolaject B_{12} plus selenium injections in May 2013.

All cattle were weighed approximately every one to two months until finishing. Target slaughter weights were 500 kg for heifers and 600 kg for steers. In April 2015 the target slaughter weight of 2012 born steers was dropped to 580 kg to facilitate a reduction in stock numbers on the farm over winter. In June 2015 the target for these steers was dropped further to 570 kg. In March 2016, the final cattle were slaughtered, with some below the 570 kg live weight target.

Cattle were processed at AFFCO, Horotiu, with in-plant measures of carcass weight, grade, pH and meat and fat colour. Meat and fat colour were visually scored on a scale of 0 (white) to 9 (yellow) for fat colour and 1A (light red) to 7 (dark red) for meat colour (AUS-MEAT scale, Appendix 8.3). Fasted live weights were not provided by the plant, so dressing out percentages are based on live weights recorded on farm during drafting for slaughter. Values may therefore appear lower than true dressing out percentages due to gut fill effects.

3.5 Statistical analyses

Data were analysed with Genstat (version 17) for effects of sire type, individual sires, dam traits, gender and coat colour, with data from twin cattle excluded. Analyses were performed for individual cohorts and for the combined (2012 and 2013 born) cohorts. Where results were similar across cohorts, only combined analyses are reported, with year of birth included as a factor. Data were adjusted for gender where results were pooled across heifers and steers. Dam live weight affected birth weight ($P<0.05$), and hence all birth weight data were adjusted for dam live weight during analysis. For carcass dressing out percentage, pH and fat colour, data were adjusted for carcass weight during analysis.

4. RESULTS AND DISCUSSION

4.1 Mating

4.1.1 Labour

Pre-planning to determine which cows and how many to inseminate with beef semen was required to reduce the risk of not getting enough dairy replacements and ensuring replacements came from the best dairy cows. This included considering desired replacement rates, likely reproductive performance and calf losses, as well as the farms variability in these parameters. In the first year, a total of 10 hours was involved in this decision making, while also taking into account specific needs of the research farm. This was considered much more than what would be required on a commercial farm. Using the same information in subsequent years, simplifying the selection process to include cows that may be culled, and familiarity with the process reduced planning to less than 2 hours.

All bulls used for natural mating were easy to manage with a good temperament.

4.1.2 Costs of mating

The costs of beef semen were significantly less than for dairy semen, especially in the case of DNA Proven dairy semen. The costs per insemination, excluding GST and any discounts in 2011 were:
Ezicalve beef semen: **$16.60** ($10.50 straw, $6.10 technician)
Daughter Proven Premier Sires dairy semen: **$20.60** (all inclusive)
Alpha Nominated DNA Pak (dairy): **$29.20** ($23.10 straw, $6.10 technician)

Most commercial dairy farms use Daughter Proven Premier Sires across the entire herd, so there would be a saving of approximately 20% for each cow inseminated with beef semen. For farms that use nominated bulls across the whole herd, there is potential for even greater savings. It would therefore be cost effective to mate all cows surplus to requirements for possible dairy replacements (including likely culls) to beef sires. Other beef semen options are also available, with bulls typically selected on calving ease (Livestock Improvement Corporation Limited 2012, CRV Ambreed 2016) Conception rates were not recorded for this project, so it is uncertain whether there were any differences across sire types.

The difference in costs between recorded and unrecorded bulls for natural mating were not calculated for the project. In 2011, Ezicalve Hereford bulls were provided by Ardo Farms for tail-up mating at no cost. The estimated lease value was $650 per bull for the season. The remaining unproven bulls were purchased for $1,750 each. This was at the lower end of the prices for Ezicalve bulls sold at auction the same year of $1,600 to $2,700.

4.2 Calving

Hereford cross calf birth weights ranged from 25 to 54 kg across sires and years. Ezicalve AI sired calves averaged 3.5 to 4 kg lighter at birth than calves sired naturally by unrecorded Hereford bulls ($P<0.01$), after adjusting for calf gender and cow live weight. For calves sired naturally by Ezicalve bulls, the birth weights averaged 3.5 kg lighter than those from unrecorded bulls in 2012 ($P<0.001$), but were similar to those from unrecorded bulls in 2013. Differences between years reflected differences in the birth weight EBVs of Ezicalve sires used for natural mating each year (Appendix 8.2 and 8.3). Birth weight differences between AI and naturally sired calves could have also been partially influenced by differences in nutrition of the dams during gestation as a consequence of different conception dates.

The lower birth weights for Ezicalve sired calves was an advantage for calving ease. In 2012, calving assistance was not required for any calves sired by Hereford Ezicalve bulls, compared to 2 calves (4%) sired by unrecorded Hereford bulls and 3% of dairy calves. Those calves born to unrecorded Hereford bulls were above average size at birth (39 and 44 kg), with the largest one requiring veterinary assistance.

In 2013, calving assistance was not required for any of the calves sired by Ezicalve natural mating, compared to one calf (2%) sired naturally by an unrecorded Hereford bull. This was a large calf (45 kg), which died during calving. For the AI sired Ezicalve calves, there was one requiring assistance due to a breech birth, which is not related to sire genetics. For the dairy sired calves, 4% had calving problems in 2013 from cows of a similar age.

The survey of Oliver and McDermott (2005) showed that most dairy farmers believed using beef sires would increase calving problems. The results of this and other studies indicate that this belief is unfounded if using small beef breeds (e.g. Hereford, Angus, Wagyu), and selecting sires within these breeds for calving ease or low birth weight. Calving assistance could not be statistically analysed due to the low number of calving problems in this study, but Laster (1974) reported calving difficulty to increase by 2.3% for each kg increase in calf birth weight for Hereford or Angus dams. Applying this to our study, with predominantly Friesian dams, it would equate to an 8-9% decrease in calving problems when using Ezicalve compared to unrecorded Hereford sires. Hickson et al. (2015) also reported birth weights from calves born on New Zealand dairy farms and concluded that beef bulls could be selected for dairy farmers that do not increase the birth weight of their calves, particularly for Holstein-Friesian or crossbred cows.

Hereford sires available for AI in the dairy industry are selected for calving ease (Livestock Improvement Corporation 2012, CRV Ambreed 2016). The calving ease EBV combines birth weight, gestation length and a calving ease score. Ezicalve AI sires used in this study had calving ease EBVs 12-13% above the breed average. Calf birth weight accounts for 50% of the variation in calving ease, and is highly heritable (Mee 2008). However, the ease with which a calf is born is influenced by many other factors including calf shape, and foetal position, size and shape of the cow’s pelvis, the maternal environment of the cow and gestation length. A large calf relative to cow size appeared to be a factor in the calving problems for the calves sired by unproven Hereford bulls in this project.

4.3 Perceived risks and opportunities for dairy farmers

The Tokanui dairy farm management team saw value in all cows not being used for breeding dairy replacements to be mated to Ezicalve beef sires. This was because of:

1. No increase in assisted calvings compared to dairy calves
2. Reduced AI costs
3. The ability to produce higher value surplus calves early in the calving season
4. Easy identification of non-replacement heifer calves (Hereford cross)
5. All dairy heifers born were from the highest BW cows, therefore only dairy calves with a high genetic potential were reared

There was a perceived risk associated with using beef semen of not producing enough dairy replacements. This risk can be minimised by using conservative values when calculating cows available for beef AI. Farms with consistently high in-calf rates at the end of AI and low replacement rates, or those that breed replacements from yearling heifers or use sexed semen for dairy replacements would be best placed to inseminate some cows with beef semen. Using the lower BW cows for producing dairy beef calves, as in this programme, would reduce the risk of not getting replacements from the best dairy cows.

However, there is a small risk of accidental insemination of high BW cows with beef semen. Another option is to undertake a period of beef semen AI after sufficient numbers have been inseminated with dairy semen. However, some dairy farmers may prefer to reduce the duration of AI rather than use beef semen.

The dairy farm staff also preferred the Ezicalve bulls to the unrecorded Hereford bulls used and would be prepared to pay a premium for the Ezicalve bulls. This was for a combination of reasons detailed below:

1. A good relationship with the bull breeder, providing peace of mind that quality bulls (healthy, good condition, vaccinated, good temperament, fertile, high EBVs for calving ease and growth) would be supplied at a fair price.
2. Calving was easier than for unrecorded Hereford bulls and appeared easier than for Friesian calves of a similar size.

For sires used at the end of mating, their impact on gestation length is also of importance to dairy farms, to minimise late calving. Although gestation length was not measured in this research, short gestation beef sires are available to the dairy industry.

Both dairy and beef prices have fluctuated over the duration of this research programme. The value of having a contract with a calf rearer that understands the calves' genetic potential and pays an agreed price was acknowledged by staff at Tokanui, particularly when calf birth weights are lower than average with easy calving genetics. With the improved beef prices and current slump in dairy prices, increased use of beef sires in general should currently prove beneficial. The typical premium received for Hereford cross calves over Friesian bull calves (Oliver and McDermott 2005), along with the lower cost of beef semen compared to dairy also provides a financial incentive for the use of beef AI in the dairy industry.

4.4 Calf rearing

There were no observed differences between Ezicalve sired and other Hereford-cross calves in their feeding ability or ease of management. Calves were subjected to a number of health issues, including *Cryptosporidium parvum* and pneumonia but no differences were noted amongst sire types.

The average calf growth rate for all sire types was within the range reported by Muir et al. (2000) when comparing 4 commercial calf rearing systems. Live weight gain and time taken to reach 100 kg live weight did not differ amongst sire types in either year, despite the Ezicalve sired calves being slightly smaller at birth. In 2012, the average live weight gain for Ezicalve AI sired calves, Ezicalve naturally sired calves and calves naturally sired by unrecorded bulls was 0.68, 0.69 and 0.67 kg/day, respectively. These calves reached 100 kg at 92, 88 and 89 days, respectively (Figure 3). In 2013, the average live weight gain for Ezicalve AI sired calves, Ezicalve naturally sired calves and calves naturally sired by unrecorded bulls was 0.64, 0.63 and 0.62 kg/day, respectively. These calves reached 100 kg at 97, 94 and 94 days, respectively (Figure 4). There was also no difference in growth rate amongst Ezicalve AI sired calves ($P>0.1$).

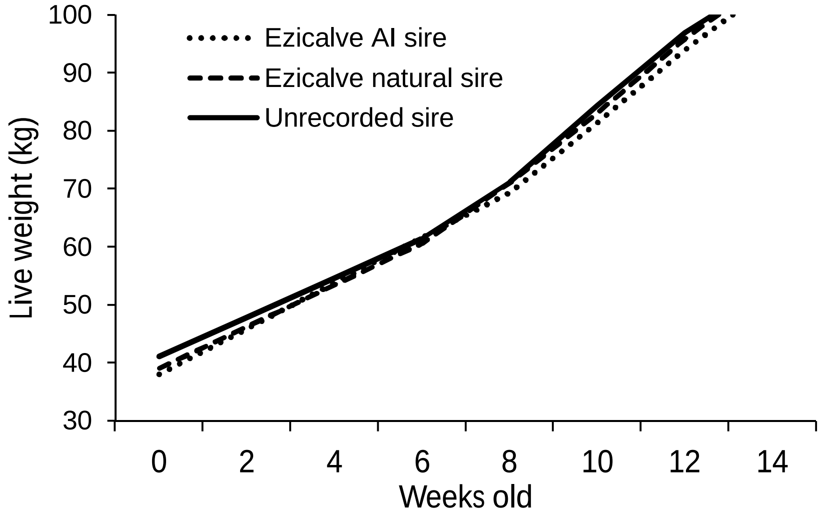

Figure 3. Live weight gain of Hereford cross calves born in 2012 and sired by Ezicalve AI, Ezicalve natural mating or natural mating with an unrecorded sire.

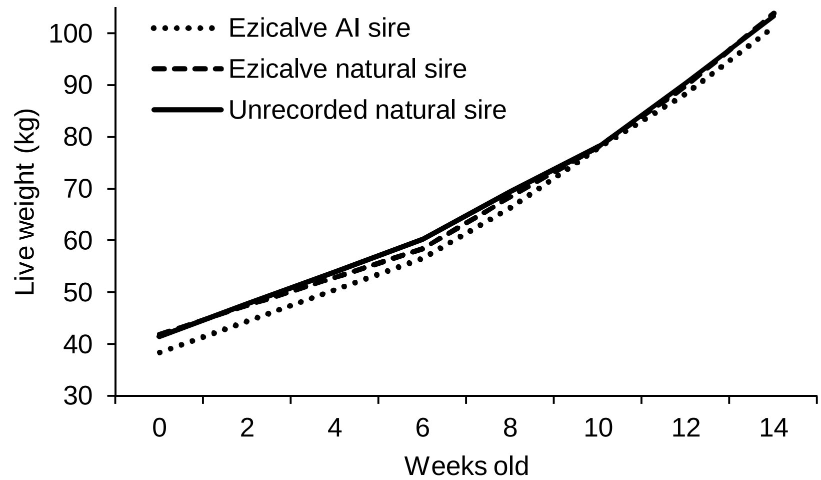

Figure 4. Live weight gain of Hereford cross calves born in 2013 and sired by Ezicalve AI, Ezicalve natural mating or natural mating with an unrecorded sire.

As calves were pen-fed in groups for this study, the individual feed intakes of calves was not known. Hence, it is uncertain if there were any differences in feed conversion efficiency between sire types. Assuming no differences, the average costs to rear calves sired by either Ezicalve or unrecorded bulls were similar, as they were weaned off milk and meal and reached 100 kg at a similar age.

Where calves are procured through sale yards, profitability would depend on purchase price (4+ day old) and sale (100 kg) price, which change with supply and demand throughout the season. Prices depend on multiple factors, but are typically higher early in the season and drop off at the tail end of the season. AI sired dairy beef calves were born an average of 5 weeks earlier than naturally sired calves, indicating they are more likely to be sold at the peak time for pricing for both 4 day old and 100 kg calves.

As cows inseminated with beef semen were selected on the basis of BW, an analysis of the impact of dam BW on performance during calf rearing was undertaken. Dairy BW is a ranking on the likely profitability of a cows' progeny for dairying. It is calculated on multiple traits, including milk production, fertility, survival, somatic cell count and live weight. Figures 5 show there was a poor relationship between a dams BW and the time taken for its dairy beef progeny to reach 100 kg. This was the case in both years, indicating that dairy dam BW is not an important trait to consider for the potential growth of a calf during rearing.

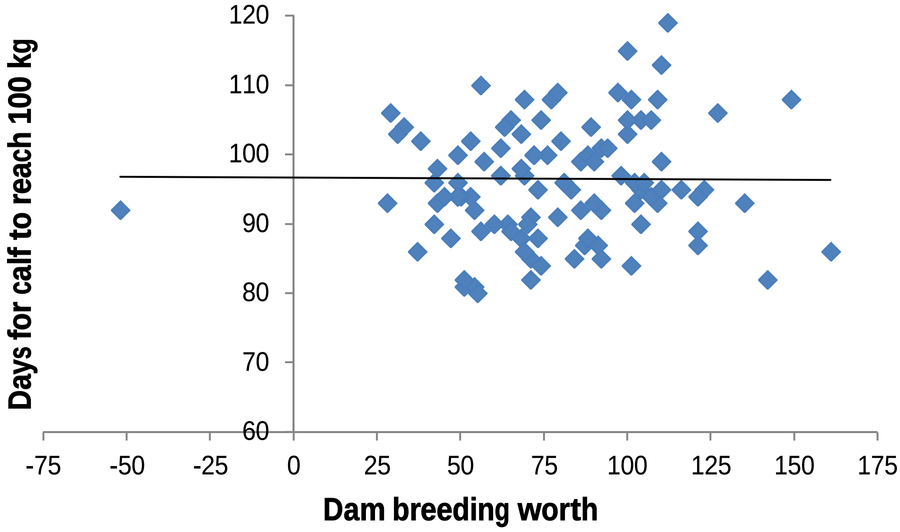

Figure 5. Relationship between dam breeding worth and time taken for calf to reach 100 kg for Ezicalve AI sired dairy beef calves born in 2013.

There was also a poor correlation between 12 week live weight and the calf's estimated BV for live weight, calculated using the average of the dam's mature live weight BV and the sires 200 or 600 day live weight BV (Burggraaf 2014). Muir (2009) performed a similar analysis with dairy breed bulls and found a poor correlation between BV for live weight and live weight at slaughter. He suggested that the BV for live weight used for cows in the dairy industry may be of limited use in the bull beef industry. There were also no relationships between the growth of calves and other dam traits, including, frame size, age and proportion of Friesian genetics (Burggraaf 2014).

Overall there was little difference in the performance of black- versus red-coated calves during rearing, although black calves reached 100 kg an average of 3.5 days earlier than red calves ($P<0.05$) in 2013. Similarly, Muir (2009), found only a 1 kg advantage in live weight at 12 weeks for Friesian bulls calves compared to mixed and "odd-coloured" calves purchased for rearing at the same size.

4.5 Finishing

4.5.1 Pasture conditions

The farm was subjected to three successive droughts during the study (Figure 6), compromising feed supply and quality over summer and autumn (Figure 7). The metabolisable energy (ME) content of the pasture was typically at or below 10 MJ/kg DM over this period and crude protein concentrations also dropped below 15% of DM, which may limit animal growth (Litherland et al. 2002). These conditions were within the normal range for hill country pastures (Rennie et al. 2014) that many cattle are now finished on.

The use of supplementary feed was limited to 3 weeks of feeding baleage to the 2103 born cattle in early April 2014, when pasture supply and quality were extremely poor.

Figure 6. Trial cattle in a holding paddock following weighing during drought conditions at Whatawhata in March 2013.

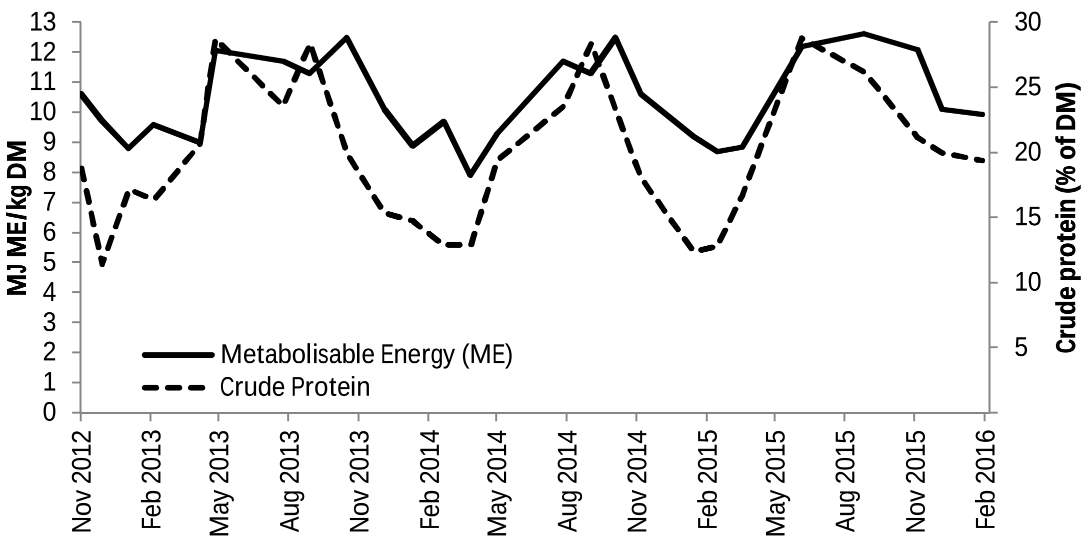

Figure 7. Metabolisable energy and crude protein content of pastures grazed by cattle during finishing at Whatawhata.

4.5.2 Live weight gain

Sire effect
The aim of this project was to assess the impacts of sire genetics on performance, but in summer and autumn, live weight gain was limited (Figure 8 and 9) due to poor feed quality and feed supply (Figure 7). In spite of some beef finishing systems achieving average live weight gains of 0.8 to 1.0 kg/day, a large number of New Zealand finishing cattle do not reach carcass weights over 270 kg before 30 months of age (Morris 2007). That was the

case in this project, with average live weight gain from 100 kg to 2 years of age of 0.55 kg/day. Everitt et al. (1980) recorded similar performance (0.52 kg/day) for Hereford-Friesian cross steers across a group of New Zealand farms.

Those cattle that were sired by AI were approximately 20-30 kg heavier than naturally sired cattle throughout the finishing period for both cohorts of cattle (Figure 8 and 9). For 2012 born heifers, these differences were no longer evident from June 2014, as the first AI sired cattle reached mature live weight. The live weight advantage of AI sired cattle was a consequence of them being born earlier and hence being older at any given date, rather than having higher growth rates (Table 1). Although AI sired cattle have a greater chance of finishing before their second winter, the timing and type of calf purchased needs to fit the farm system and seasonal feed supply.

For naturally sired cattle, those that were from Ezicalve sires had similar average growth rates to those sired by unrecorded bulls (Figure 8 and 9, Table 1). Although some of the unrecorded bulls produced cattle with good growth rates, because they had no EBVs it was not possible to predict which bull would produce the fastest growing progeny.

Within Ezicalve AI sires, Rocket produced faster growing cattle than Caspian or Russia (Table 2), reflecting the differences in their live weight EBVs (Appendix 8.1). However, between year differences had a greater impact on live weight gain than sire, with those cattle born in 2013 averaging 0.06 kg/day faster live weight gain from 100 kg to 2 years old than those born in 2012 (P<0.001).

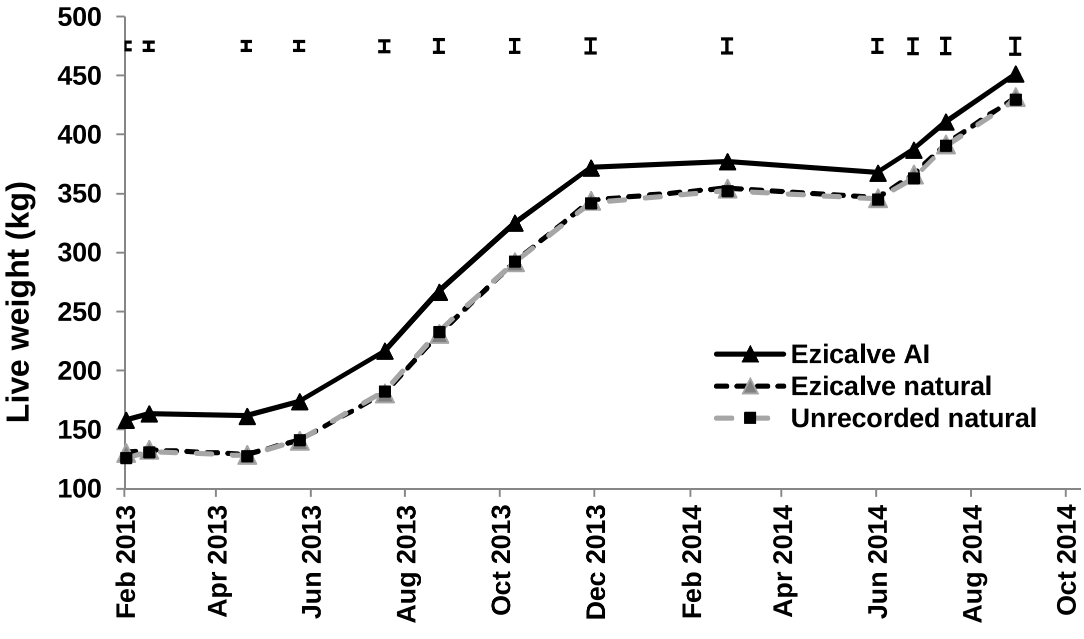

Figure 8. Mean live weight of dairy beef cattle from the final transfer of calves from the dairy farm to the first slaughter from Ezicalve AI, Ezicalve natural and unrecorded natural Hereford sires. Error bars represent LSD (P<0.05). Means were adjusted for gender (steer and heifer).

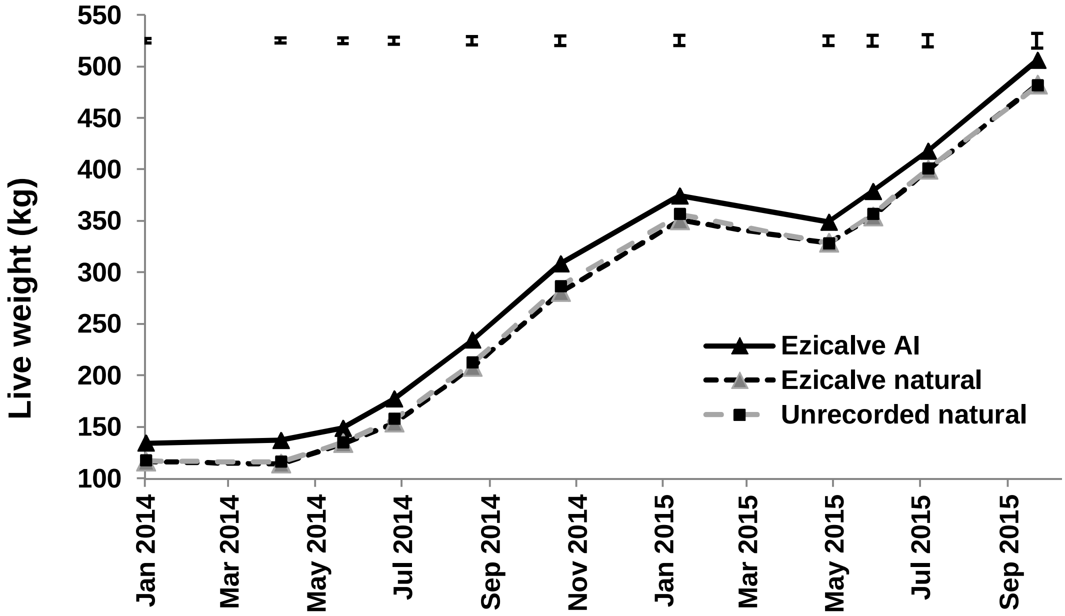

Figure 9. Mean live weight of dairy beef cattle from the final transfer of calves from the dairy farm to the first slaughter from Ezicalve AI, Ezicalve natural and unrecorded natural Hereford sires. Error bars represent LSD (P<0.05). Means were adjusted for gender (steer and heifer).

Table 1. Live weight gain of Hereford-dairy cross cattle sired by Ezicalve AI, Ezicalve natural sires or unrecorded natural sires to first slaughter in September 2014 or October 2015 (approximately 2 years old). Data are adjusted for gender.

	Ezicalve AI (kg/day)	Ezicalve natural (kg/day)	Unrecorded natural (kg/day)	SED
2012 born				
Birth to Sep 2014	0.53	0.54	0.54	0.012^{NS}
100 kg to Sep 2014	0.51	0.52	0.52	0.013^{NS}
Feb 2013 to Sep 2014	0.52	0.55	0.53	$0.014^{\dagger}$
2013 born				
Birth to Oct 2015	0.58	0.58	0.58	0.01^{NS}
100 kg to Oct 2015	0.58	0.59	0.58	0.01^{NS}
Jan 2014 to Oct 2015	0.59	0.58	0.58	0.01^{NS}

NS= not significant, † = P<0.1

Table 2. Effect of Ezicalve AI sire on live weight gain of dairy beef heifers and steers from 100 kg live weight to first slaughter at approximately 2 years old.

	Rocket (kg/day)	Caspian (kg/day)	Russia (kg/day)	SED
2012 born	0.54	0.50	0.50	0.012**
2013 born	0.60	0.57	-	0.012*

* = P<0.05, ** = P<0.01

Dam traits and coat colour effects
Cow BW had no significant effect (P=0.427) on the growth of their progeny during finishing, indicating selecting low BW dairy cows to inseminate with beef semen does not reduce the potential growth of dairy beef cattle during finishing. Although pure Jersey cattle grow slower than Friesians (Barton et al. 1994), the percentage of Friesian relative to Jersey genetics in the dams had no effect on the live weight gain of their progeny during finishing in this study (P=0.652). Dam frame size also did not affect growth during finishing, and dam live weight (P<0.05) only showed a positive relationship with live weight gain during finishing for 2013 born heifers.

Cattle with black coats had a small advantage over those with red coats in live weight gain from 100 kg to approximately 2 years old (0.55 versus 0.53 kg/day: P<0.05). This difference was small compared to the effect of different sires, but is comparable to the 10 kg live weight advantage at slaughter for Friesian bulls compared to odd-coloured cattle found by Muir (2009).

When comparing cattle from the same sire, birth date had no effect on live weight gain during finishing, but calves that were lighter at birth had lower rates of live weight gain over finishing (P<0.001) and from birth (P<0.01) than heavier calves.

4.5.3 Carcass traits and value

Effect of sire type
Ninety five percent of carcasses were graded P2, across all sire groups. For heifers, 69% were 245-270 kg, 28% from 220-245 kg and 3% from 270 to 295 kg. For steers, 51% were 270-295 kg, 34% were 295-320 kg and 12% were 245-270 kg. Differences amongst sire types in carcass weights could be attributed to date of birth and the subsequent differences in slaughter dates and age (Table 3), with approximately 70% of the AI sired steers slaughtered before a reduction in slaughter weight targets, compared to half of the naturally sired steers. In comparison, average carcass weights were similar across sire types for the heifers (average of 250 kg, P= 0.46).

Dressing out percentage averaged 1% higher for the progeny of unrecorded bulls than those from Ezicalve bulls or AI, and prices received for their carcasses was higher than for those naturally sired by Ezicalve bulls. However, the revenue received relative to the amount of time the cattle were on farm was similar across sire types (Table 3). Although this gives a general indication of economics for beef finishers, many variables impact on the profitability of AI versus naturally sired calves. Differences in birth date and therefore supply date to the finishing farmer and likely finishing date affect weaner calf price, feed demand relative to supply and price per kg carcass weight (Figure 10). It was expected that the AI sired cattle would produce greater returns as they were supplied earlier and therefore more likely to be finished before their second winter. However, severe droughts limited growth, so all cattle were carried through a second winter.

For all cattle that were sired naturally, pH, meat and fat colours were similar (Table 3). Only 1% of cattle had a carcass pH above the desirable range of 5.4 to 5.8. These were evenly split across the sire types and only occurred on the final slaughter date for the second cohort of steers. Increasing meat pH with age at slaughter has previously been reported (Smith et al. 1999), and age had a significant (P<0.001) effect on pH for the heifers in this study, as did slaughter date (P<0.05). The tendency for slightly higher average pH in AI sired calves than those sired naturally in this study (Table 3) also reflects differences in slaughter dates (P<0.001) and ages (P<0.01). Meat colour was strongly affected by carcass weight (P<0.01), as also found by Smith et al. (1999), with little influence of sire type (Table 3). Fat colour was similar amongst sire types (Table 3). Differences between heifers and steers were noted for pH (P<0.05), meat colour (P<0.001) and fat colour (P<0.001) after adjusting for age and slaughter date.

Table 3. Carcass traits and value (average of steers and heifers across years) sired by Ezicalve AI, Ezicalve natural mating or unrecorded sire natural mating. Dressing out %, pH, meat and fat colour were adjusted for carcass weight before analysis.

Trait	Ezicalve AI	Ezicalve natural	Unrecorded natural	SED
Slaughter age (days)	882	866	870	11.8**
Carcass weight (kg)	272	265	269	1.8 **
Dressing out %	47.9	47.7	48.7	0.17***
$/carcass	1376	1335	1378	30.3*
$/day from birth[1]	1.57	1.55	1.60	0.02^{NS}
$/day from 100 kg[2]	1.79	1.77	1.82	0.03^{NS}
pH	5.58	5.52	5.55	$0.03^{\dagger}$
Meat colour	4.59	4.37	4.37	$0.11^{\dagger}$
Fat colour	4.99	4.86	4.99	0.10^{NS}

NS= not significant, † = P<0.1** = P<0.01, *** = P<0.001.

[1] Carcass price divided by days old at slaughter.

[2] Carcass price divided by number of days between reaching 100 kg live weight and slaughter.

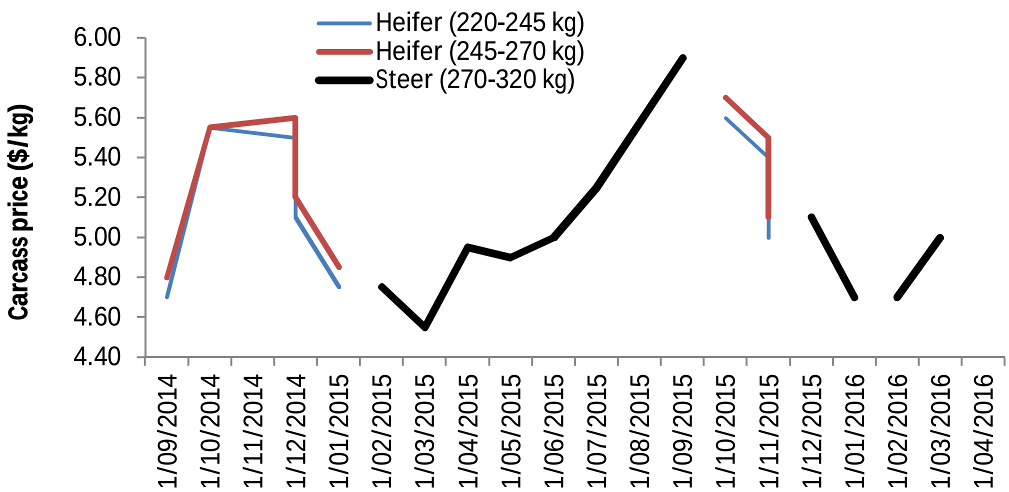

Figure 10. Carcass price received for P2 steers and heifers throughout the trial.

Effect of Ezicalve AI individual sires

In 2012, Russia sired cattle had intermediate carcass weights compared to those sired by Caspian and Rocket and similar meat pH, colour, fat colour and days to finishing. Because of the higher growth rates of Rocket compared to Caspian sired cattle, those sired by Rocket were slaughtered an average of 20 days earlier than those sired by Caspian. Despite this, they also had heavier carcass weights and dressing out percentages (Table 4).

The heavier carcasses of Rocket sired cattle resulted in them receiving more revenue per animal than those sired by Caspian (Table 4). Because these cattle were also finished at a younger age the income received from them relative to the time they took to finish was also greater (Table 4). Carcass pH, meat and fat colour did not differ across individual

Ezicalve AI sires (Table 4). The higher carcass weights and value of Rocket sired cattle compared to Caspian reflects their higher 600 day weight and carcass weight EBVs (Appendix 8.1). This demonstrates the value of using cattle with higher estimated breeding values for these traits for beef finishing. However, breeding value accuracy should also be considered, with the proven bulls used for AI typically having greater accuracy than those used for natural mating (Appendices 8.1 and 8.2) and therefore more likely to have progeny that perform in accordance to their EBVs.

Table 4. Carcass traits and value of Ezicalve AI sired cattle born in 2012 and 2013. Dressing out %, pH, meat and fat colour were adjusted for carcass weight.

	Heifers			Steers		
Trait	Rocket	Caspian	SED	Rocket	Caspian	SED
Slaughter age (days)	819	843	6.06***	907	915	13.0^{NS}
Carcass weight (kg)	254	245	2.23***	300	283	3.56***
Dressing out%	49.0	47.7	0.23***	48.3	47.6	0.61†
$/carcass	1376	1291	23.7***	1481	1359	24.9***
$/day from birth[1]	1.68	1.54	0.03***	1.65	1.48	0.03***
$/day from 100 kg[2]	1.90	1.75	0.03***	1.85	1.67	0.03***
pH	5.56	5.57	0.04 ^{NS}	5.70	5.58	0.06 ^{NS}
Meat colour	4.67	4.57	0.21 ^{NS}	3.92	3.95	0.19 ^{NS}
Fat colour	4.61	4.56	0.24 ^{NS}	5.53	5.70	0.13 ^{NS}

NS= not significant, † = P<0.1, *** = P<0.001.

[1] Carcass price divided by days old at slaughter.

[2] Carcass price divided by number of days between reaching 100 kg live weight and slaughter.

Effect of dam traits and coat colour

Although dairy breeding worth (BW) is a key parameter used in the breeding and culling decisions in dairy herds, dam BW had no effect on the finishing performance or carcass traits of the dairy beef progeny in this project. Dam live weight, frame size and percentage of Friesian relative to Jersey parentage also had no consistent influence on any of these parameters. Previous research has shown Jersey cattle to have yellower fat than Friesians (Morgan et al. 1969). Burke et al. (1998) also found yellower fat at slaughter in once-bred Hereford x Jersey than Hereford x Friesian cross heifers. In our study, dams were no more than 50% Jersey, so the cross-breeding of the dams in this trial would have diluted any dam breed effects.

Coat colour did not affect dressing out percentage, but cattle with black coats had carcass weights an average of 4 kg heavier (P<0.05) and were slaughtered an average of 2 weeks earlier than those with red coats (P<0.01), reflecting their higher rate of live weight gain over finishing. Averaged over the two cohorts of cattle, the revenue received from these carcasses averaged $26 higher (P<0.05), and provided an extra 6 cents revenue per day from birth (P<0.01) or 7 cents per day from 100 kg live weight (P<0.01). This is a lot smaller than the benefit achieved from using Ezicalve sires with the highest compared to the lowest 600 day weight EBVs. Coat colour had no effect on pH, fat colour or meat colour.

5. CONCLUSIONS

Use of beef sires with high EBVs for calving ease and growth on dairy farms has shown benefits for the dairy and beef industry:

- With the lower cost of beef than dairy semen and the current high prices received for 4-day old dairy beef calves, using beef semen on a portion of the dairy herd or beef bulls for natural mating will be profitable for dairy farmers.
- Using beef sires with high EBVs for calving ease also provided additional value through minimised calving problems on the dairy farm.
- For calf rearers, despite that calves sired by Ezicalve bulls tended to be slightly lighter at birth than those sired by unrecorded bulls, they took a similar length of time to reach 100 kg, and hence would have similar rearing costs.
- Although some unrecorded bulls can produce cattle that grow and finish well, it comes with a risk of not being able to predict which bulls will produce the fastest growing cattle and the possibility of calving problems.
- Ezicalve sires with the highest EBVs for live weight grew faster and produced more revenue than Ezicalve sires with lower EBVs for live weight, indicating it is economically feasible for beef farmers to pay more for cattle sired by bulls with high live weight EBVs. However, the EBV accuracy should also be considered.
- Dam characteristics and coat colour had little effect on the performance of dairy beef cattle.

6. ACKNOWLEDGEMENTS

This project was funded by the Beef + Lamb New Zealand Mid Northern North Island Farmer Council, with sponsorship from Ezicalve and LIC Limited. The author is also grateful for data collection and animal management by the staff at AgResearch Tokanui and Whatawhata and statistical analysis by Catherine Cameron. Sincere thanks for the on-going support from the Beef + Lamb New Zealand Mid Northern North Island Farmer Council, particularly Doug Lineham, Mark Bocock and Tim Hale, as well as input from members involved in the initiation of the project along with Gavin Sheath.

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8. APPENDICES

8.1 Ezicalve Hereford sires used for artificial insemination.

NZ Hereford Animal Details

ARDO CASPIAN 6159

HerdBook No.:	0277066159
Sex:	Male
Horn:	Polled
Tattoo:	066159
Birth Date:	11/09/2006
Calving Year:	2006
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	110
DNA Number:	3087557
Sire:	ARDO RUSSIA 4045
Dam:	ARDO ALMOND T454 (SBM)
Breeder:	MORRISON FARMING
Current Owner:	MORRISON FARMING
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

2011 SUMMER NEW ZEALAND GROUP BREEDPLAN EBVS

	Calv. Ease Direct (%)	Gest. Len. (days)	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Maternal Value (kg)	Scrotal Size (cm)	Days to Calv.	Carcase Wt. (kg)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)
EBV	+12.3	-2.1	**-1.2**	+21	+34	+43	+35	+13	+12	+2.0	-4.1	+41	+2.3	+0.5	+0.9	+0.6
Acc	59%	56%	89%	84%	81%	78%	67%	56%	63%	83%	38%	66%	51%	57%	62%	52%
Breed Avg. EBVs for 2009 Born Calves Click for Percentiles																
EBV	-0.4	-0.1	+4.3	+26	+42	+60	+59	+12	-	+1.4	-1.7	+36	+2.3	+0.1	+0.1	+0.7

Traits Observed: BWT, 200WT(x2), 400WT(x2), 600WT, SS, FAT, EMA
Statistics: Number of Herds: **1**, Progeny Analysed: **37**, Scan Progeny: **16**,

SELECTION INDEX VALUES

Market Target	Index Value	Breed Average
Hereford Prime / Maternal ($)	+$ 66	+$ 46
Export / Maternal ($)	+$ 58	+$ 42
Dairy / Maternal ($)	+$ 104	+$ 34

NZ Hereford Animal Details

KOANUI ROCKET 0219 (BM)

HerdBook No.:	0216000219
Sex:	Male
Horn:	Polled
Tattoo:	000219
Birth Date:	20/07/2000
Calving Year:	2000
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	104
DNA Number:	825
Sire:	KOANUI ROCKET Q334 (BM) (ET)
Dam:	KOANUI ANGEL R187 (SBM)
Breeder:	KOANUI POLLED HEREFORDS LTD
Current Owner:	MORRISON FARMING
Benchmark Status:	BM Sire (27/03/08)
	NZ Hereford Benchmark Program
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

2011 SUMMER NEW ZEALAND GROUP BREEDPLAN EBVS

	Calv. Ease Direct (%)	Calv. Ease Dtrs (%)	Gest. Len. (days)	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Maternal Value (kg)	Scrotal Size (cm)	Days to Calv.	Carcase Wt. (kg)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF %
EBV	+13.2	+14.8	0.0	**-0.8**	+29	+56	+69	+63	**+21**	+18	**+3.4**	-6.3	+62	+3.0	+1.0	+1.9	+0.5	-0.3
Acc	94%	88%	98%	99%	98%	98%	98%	96%	97%	97%	98%	76%	94%	88%	91%	93%	89%	89%
Breed Avg. EBVs for 2009 Born Calves Click for Percentiles																		
EBV	-0.4	+0.9	-0.1	+4.3	+26	+42	+60	+59	+12	-	+1.4	-1.7	+36	+2.3	+0.1	+0.1	+0.7	0.0

Traits Observed: BWT, 200WT, 400WT, FAT, EMA

Statistics: Number of Herds: **73**, Progeny Analysed: **1662**, Scan Progeny: **786**, Number of Dtrs: **272**

SELECTION INDEX VALUES

Market Target	Index Value	Breed Average
Hereford Prime / Maternal ($)	+$ 95	+$ 46
Export / Maternal ($)	+$ 83	+$ 42
Dairy / Maternal ($)	+$ 147	+$ 34

NZ Hereford Animal Details

ARDO RUSSIA 4133

HerdBook No.:	0277044133
Sex:	Male
Horn:	Polled
Tattoo:	044133
Birth Date:	11/09/2004
Calving Year:	2004
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	108
DNA Number:	492193
Sire:	KOANUI ROCKET 0219 (BM)
Dam:	ARDO LYDIA P955
Breeder:	MORRISON FARMING
Current Owner:	MORRISON FARMING
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

2011 SUMMER NEW ZEALAND GROUP BREEDPLAN EBVS

	Calv. Ease Direct (%)	Calv. Ease Dtrs (%)	Gest. Len. (days)	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Maternal Value (kg)	Scrotal Size (cm)	Days to Calv.	Carcase Wt. (kg)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF %
EBV	+11.7	+10.9	-0.6	-1.8	+17	+38	+45	+45	+18	+13	+1.2	-3.6	+43	+2.5	+0.5	+0.8	+0.5	-0.2
Acc	76%	64%	89%	96%	92%	91%	89%	79%	76%	80%	89%	51%	78%	66%	71%	76%	68%	63%
Breed Avg. EBVs for 2009 Born Calves Click for Percentiles																		
EBV	-0.4	+0.9	-0.1	+4.3	+26	+42	+60	+59	+12	-	+1.4	-1.7	+36	+2.3	+0.1	+0.1	+0.7	0.0

Traits Observed: BWT, 200WT, 400WT(x2), 600WT, SS, FAT, EMA, IMF

Statistics: Number of Herds: **4**, Progeny Analysed: **134**, Scan Progeny: **69**, Number of Drts: **13**

SELECTION INDEX VALUES

Market Target	Index Value	Breed Average
Hereford Prime / Maternal ($)	+$ 69	+$ 46
Export / Maternal ($)	+$ 61	+$ 42
Dairy / Maternal ($)	+$ 114	+$ 34

8.2 Ezicalve Hereford bulls used for natural mating on 2011.

NZ Hereford Animal Details

ARDO RUSSIA 8313

HerdBook No.:	0277088313
Sex:	Male
Horn:	Polled
Tattoo:	088313
Birth Date:	02/09/2008
Calving Year:	2008
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	112
DNA Number:	800024076
Sire:	KOANUI ROCKET 0219 (BM)
Dam:	ARDO BELLA 03 3033
Breeder:	MORRISON FARMING
Current Owner:	MORRISON FARMING
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

INTERIM GROUP BREEDPLAN EBVS 19/01/2011

	Calv. Ease Direct (%)	Calv. Ease Dtrs (%)	Gest. Len. (days)	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Scrotal Size (cm)	Days to Calv.	Carcase Wt. (kg)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)	IMF %
EBV	+12.2	+10.5	-1.3	-0.8	+24	+51	+64	+63	+14	+1.9	-3.6	+56	+2.7	+0.3	+0.7	+0.8	-0.1
Acc	55%	52%	57%	74%	70%	69%	68%	63%	61%	77%	44%	61%	56%	59%	62%	57%	52%
Breed Avg. EBVs for 2009 Born Calves Click for Percentiles																	
EBV	-0.4	+0.9	-0.1	+4.3	+26	+42	+60	+59	+12	+1.4	-1.7	+36	+2.3	+0.1	+0.1	+0.7	0.0

Traits Observed: BWT, 200WT(x2), 400WT(x2), SS, FAT, EMA

SELECTION INDEX VALUES

Market Target	Index Value	Breed Average
Hereford Prime / Maternal ($)	+$ 80	+$ 46
Export / Maternal ($)	+$ 72	+$ 42
Dairy / Maternal ($)	+$ 122	+$ 34

NZ Hereford Animal Details

RIVERTON DERIVE 08 196

HerdBook No.:	0091080196
Sex:	Male
Horn:	Polled
Tattoo:	080196
Birth Date:	09/10/2008
Calving Year:	2008
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	112
DNA Number:	800024072
Sire:	KOANUI DERIVE 3371
Dam:	RIVERTON SUNFLOWER 04 85
Breeder:	M & C CRANSTONE LTD
Current Owner:	MORRISON FARMING
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

INTERIM GROUP BREEDPLAN EBVS 19/01/2011

	Birth Wt. (kg)	200 Day Wt. (kg)	400 Day Wt. (kg)	600 Day Wt. (kg)	Mat. Cow Wt. (kg)	Milk (kg)	Carcase Wt. (kg)	Eye Muscle Area (sq.cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)
EBV	-0.8	+21	+38	+48	+49	+16	+42	+1.7	-0.7	-1.1	+1.2
Acc	72%	67%	68%	64%	56%	55%	54%	46%	48%	53%	45%
Breed Avg. EBVs for 2009 Born Calves Click for Percentiles											
EBV	+4.3	+26	+42	+60	+59	+12	+36	+2.3	+0.1	+0.1	+0.7

Traits Observed: BWT, 200WT, 400WT, FAT, EMA

SELECTION INDEX VALUES

Market Target	Index Value	Breed Average
Hereford Prime / Maternal ($)	+$ 56	+$ 46
Export / Maternal ($)	+$ 54	+$ 42
Dairy / Maternal ($)	+$ 82	+$ 34

NZ Hereford Animal Details

RIVERTON DERIVE 09 231

HerdBook No.:	0091090231
Sex:	Male
Horn:	Polled
Tattoo:	090231
Birth Date:	21/09/2009
Calving Year:	2009
Status:	Active
Registration Status:	Registered
HerdBook Vol.:	113
DNA Number:	800032331
Genetic Status:	[View]
Sire:	KOANUI DERIVE 3371
Dam:	RIVERTON BELLA 02 70
Breeder:	M & C CRANSTONE LTD
Current Owner:	M & C CRANSTONE LTD
Progeny:	[View All] [View by Herd]
Pedigree:	[View]
EBV Graph:	[View]

January 2012 Hereford GROUP BREEDPLAN												
	Birth Wt. (kg)	200 Day Wt (kg)	400 Day Wt (kg)	600 Day Wt (kg)	Mat Cow Wt (kg)	Milk (kg)	Days to Calving (days)	Carcase Wt (kg)	Eye Muscle Area (sq cm)	Rib Fat (mm)	Rump Fat (mm)	Retail Beef Yield (%)
EBV	-0.5	+20	+36	+46	+46	+16	-4.4	+38	+1.6	0.0	0.0	+0.5
Acc	74%	69%	69%	66%	59%	59%	38%	57%	47%	50%	54%	47%
Breed Avg. EBVs for 2010 Born Calves Click for Percentiles												
EBV	+4.3	+27	+43	+62	+60	+12	-1.8	+38	+2.5	+0.1	+0.2	+0.7

Traits Observed: BWT,200WT,400WT,FAT,EMA

Hide Index Values

SELECTION INDEX VALUES		
Market Target	**Index Value**	**Breed Average**
Hereford Prime / Maternal Index ($)	+$ 81	+$ 69
Export / Maternal Index ($)	+$ 91	+$ 76
Dairy / Maternal ($)	+$ 108	+$ 62
Dairy/Terminal Index ($)	+$ 64	+$ 44

8.3 Ezicalve Hereford bulls used for natural mating in 2012.

Animal Identification	Calving ease/rank	Birth weight/rank	Dairy Index/rank
71	5.7/5%	1.3/10%	116/5%
117	7.6/5%	0.8/5%	112/5%
118	7.4/5%	0.7/5%	114/5%
134	6.7/5%	1.6/10%	118/5%
145 Ezi	8.6/1%	-0.4/5%	124/5%
150	1.8/25%	1.8/10%	64/50%
207	6.8/5%	0.6/5%	92/20%
236 Ezi	10.7/1%	-1.0/1%	128/5%
247	7.4/1%	-0.2/5%	95/15%
249 Ezi	10.3/1%	-1.6/1%	125/5%
268*	1.4/30%	3.7/30%	89/20%
338	6.7/5%	1.8/10%	118/5%
378	3.9/15%	1.9/10%	118/5%
418	3.1/15%	1.8/10%	70/40%
422	4.0/10%	1.4/10%	99/15%
434	**	1.4/10%	95/15%
442 Ezi	9.9/1%	-1.4/10%	124/5%
443	6.2/5%	1.8/10%	116/5%
540	6.7/5%	1.4/10%	120/5%
547	8.9/1%	-1.6/1%	124/5%
BREED AVERAGE	0.4/50%	+4.4/50%	$64/50%

*The sire of this bull was selected for short gestation.
**Not enough data were available to generate an EBV.

8.4 Fat and meat colour scoring methods

FAT COLOUR

Fat colour is the intermuscular fat lateral to the rib eye muscle. It is assessed on the chilled carcase and scored against the AUS-MEAT fat colour reference standards. Fat colour is assessed by comparing the intermuscular fat colour lateral to the M. longissimus dorsi and adjacent to the M. iliocostalis and is scored against the AUS-MEAT Fat Colour reference standards.

Colours displayed show the darkest colour of each grading and it is a guide only, not a true representation.

0	1	2	3	4	5	6	7	8	9
									Colour darker than the 8 chip

BEEF MEAT COLOUR

Colours displayed show the darkest colour of each grading and it is a guide only, not a true representation.

1A	1B	1C	2	3	4	5	6	7
								Colour darker than the 6 chip