

A comparison of bull beef production from Friesian type and selected Jersey type calves

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Abstract

Three on-farm experiments were undertaken to examine the comparative performance of Friesian and selected Jersey x Friesian bulls in intensive bull beef systems. In Experiment 1, Friesian, $\frac{1}{4}$ Jersey/ $\frac{3}{4}$ Friesian and $\frac{1}{2}$ Jersey/ $\frac{1}{2}$ Friesian bulls were sourced as 4-day-old calves, reared together and farmed commercially through until slaughter at 29 months of age. When slaughtered at the same age, Friesian bulls averaged 290 kg carcass weight, with $\frac{1}{4}$ Jersey and $\frac{1}{2}$ Jersey bulls averaging 289 and 271 kg, respectively. There was considerable variation in animal performance within the breed types, with the top 50% of the $\frac{1}{2}$ Jersey bulls averaging 553 kg liveweight and the bottom 50% of the Friesian bulls averaging 522 kg at 29 months of age. In Experiment 2, 31 rising 2-year-old Friesian type bulls (436 kg) and 32 rising 2-year-old Jersey x type bulls (423 kg) were each allocated to two lanes of a Technosystem and stocked at 1828 kg liveweight/ha. Between May and November, Friesian type bulls produced 2.5% more beef liveweight per hectare than the Jersey x bulls (816 vs 796 kg of liveweight/ha). In Experiment 3, 43 rising 1-year-old Friesian type (199 kg) and 46 rising 1-year-old Jersey x bulls (185 kg) were each allocated to two lanes of a Technosystem and stocked at 1016 kg liveweight/ha. Between June and December, Jersey x type bulls produced 1% more liveweight/ha than the Friesian type bulls (1151 vs 1141 kg of liveweight/ha). The Friesian type bulls outperformed the Jersey x type bulls on a per head basis. Nevertheless there were a number of high performing Jersey x type bulls, suggesting that coat colour is not a suitable means of identifying better or poorer performing bulls. When Friesian type and Jersey x type bulls were stocked at a similar liveweight per hectare, there was little difference in terms of total output of beef per hectare. Since bulls are bought and sold on a liveweight basis, Jersey x type bulls can be as profitable as Friesian type bulls provided the purchase price is discounted to reflect the fact that more of them will be slaughtered in lower paying weight ranges. Our

calculations indicate that on present prices, this discount for selected Jersey x type bulls could be as little as \$11 per head to offset reductions in carcass value. Current discounts for Jersey x type bulls are well in excess of this and may reflect the difficulties in re-selling Jersey x type bulls and perceived behavioural problems with these bulls.

Keywords: bull beef, Friesian, Jersey, per head, per hectare

Introduction

New Zealand bull beef production systems are dependent on the dairy industry for a supply of surplus male calves. Whilst there is a strong demand for well-marked Friesian calves, the actual supply of these calves has decreased over recent years because of a trend within the dairy industry towards cross breeding Friesians with Jerseys. As a result of these trends, only 57% of dairy cows are currently classed as Friesians. Moreover, 26% of these Friesian cows were inseminated with Jersey semen in the 1999 season (Anon 2000).

In spite of difficulties in sourcing Friesian bull calves, there is reluctance on the part of calf rearers to rear poorly marked calves because of a historical prejudice amongst beef finishers against Jersey x cattle. This is based on perceptions of slow growth rate and poor meat quality (principally yield and fat colour effects). Much of the early work involving Jersey x cattle dates back to the 1960s and was focused on lighter weight steers (Joblin 1966; Barton *et al.* 1994) and bulls (Everitt and Ward 1974). In bull finishing systems, fat colour is not an issue and in recent years, output of meat and profit per hectare have become more important than growth rate *per se*. The aim of the current work was to provide some preliminary data on the comparative output of bull beef on both a per head and per hectare basis using current Friesian type and Jersey x type genotypes.

Methods

Experiment 1

In August 1997, 64 Friesian, 25 $\frac{1}{4}$ Jersey/ $\frac{3}{4}$ Friesian and 44 $\frac{1}{2}$ Jersey/ $\frac{1}{2}$ Friesian bull calves were sourced

from Waikato dairy farms at approximately 4 days of age. Because no calves under 35 kg were selected, a high degree of selection pressure would have been placed on the Jersey type calves. Nevertheless, all the $\frac{1}{4}$ and $\frac{1}{2}$ Jersey calves used in this experiment would otherwise have been slaughtered for bobby veal because their coat colour and markings identified them as of “Jersey type”. Calves were transported to the Poukawa Research Station in Hawke’s Bay and reared together using a once-a-day milk feeding system (System 4, Muir *et al.* 2000). Calves were weighed on arrival at Poukawa, at weaning off milk at 5 weeks of age, and at 12 weeks of age. At 14 weeks of age, calves were transported back to the Waikato and farmed together under commercial conditions (generally set stocked) and slaughtered at approximately 29 months of age. During this time, bulls were weighed at 3-monthly intervals and, as behavioural problems increased, bulls were randomly split into smaller groups to simplify management. Pre-slaughter weights were recorded at 28 months of age (10 December 1999) and bulls were drafted for slaughter over the following 6 weeks.

Experiment 2

This experiment was undertaken at Matapiro in Hawke’s Bay. Friesian type and Jersey x type rising 2-year-old bulls which had been reared and farmed together were allocated to two groups on 30 May 2000. For this experiment, allocation to groups simply involved selecting the Jersey x type from within a mixed mob. The Jersey x bulls selected tended to be the type with black legs and mottled markings and could be considered to represent the better “Jersey x type” animals. Each breed was split into two groups and randomly allocated to one of four 3.7-ha lanes of a Technosystem, an intensive livestock finishing system developed and marketed by Kiwitech (Ogle & Tither 2000). Between 15 and 17 bulls were allocated to each lane so that starting liveweight was similar for each lane at 6763 kg per lane or 1828 kg/ha. Bulls were shifted onto fresh pasture every second day. Pre-grazing pasture cover was assessed by pasture probe at monthly intervals. All bulls were weighed at monthly intervals. Bulls were weighed prior to slaughter on 9 November 2000. Carcass weight and grade was recorded at slaughter for each bull.

Experiment 3

This experiment was undertaken at Takapau in Central Hawke’s Bay. Forty-six rising 1-year-old Jersey x type bulls were purchased on 12 May 2000 and 43 Friesian type bulls were purchased on 6 June 2000 and allocated to treatment groups on 9 June 2000. Jersey x type bulls tended to be the more typical black and brown crossbred types with very few white markings. As in Experiment 1, each breed was allocated to two lanes (replicates) of a Technosystem (each of 4.2 ha) so that total liveweights per lane were similar at 4266 kg or 1016 kg/ha. On 20 December, the mobs were further split because of declining pasture covers and one each of the Friesian type and Jersey x type mobs were moved and farmed in lanes of 8.78 ha. The remaining four lanes remained where they were but had their lanes doubled to 8.64 ha. Bulls were weighed on 24 August, 20 December 2000 and 18 April 2001. The trial ceased on 18 April 2001 as a result of drought conditions and low feed covers. Pre-graze pasture covers were assessed by pasture probe on 14 July, 25 August, 28 October and 21 November 2000.

Results and discussion

Experiment 1

Friesian calves averaged 45 kg at the start of the experiment and the $\frac{1}{2}$ Jersey x calves were significantly 6 kg lighter ($P < 0.01$) at 39 kg (Table 1). These differences increased throughout the experiment to be 37 kg by the time of slaughter. Although significantly lighter at slaughter ($P < 0.01$), the $\frac{1}{2}$ Jersey x bulls still achieved carcass weights of 271 kg. There was no significant difference between the carcass weights of the Friesian (290 kg) and $\frac{1}{4}$ Jersey x bulls (289 kg). Barton *et al.* (1994) and Candy & McAdam (1966) also noted a close relationship between Friesian and Jersey x animals, albeit in steers and at much lighter liveweights. Nevertheless, the close relationship between Friesian type and Jersey x type animals indicate that there is a degree of hybrid vigour which could make the farming of Friesian x Jersey bulls profitable.

Performance of bulls within each breed was highly variable, with the top 50% of the $\frac{1}{2}$ Jersey bulls averaging 553 kg, 30 kg heavier than the bottom 50%

Table 1 Liveweights and carcass weights (\pm SEM) of Friesian (F) and Jersey (J) x bulls reared and farmed together for 29 months.

Genotype	Start weight (kg)	12 week weight (kg)	Pre-slaughter weight (kg)	Carcass weight (kg)
Friesian	44.8 \pm 0.54 ^A	100.1 \pm 1.33 ^A	559 \pm 5.58 ^A	290 \pm 3.07 ^A
$\frac{1}{4}$ Jersey/ $\frac{1}{4}$ Friesian	42.2 \pm 1.08 ^B	96.3 \pm 3.07 ^B	553 \pm 12.16 ^A	289 \pm 6.70 ^A
$\frac{1}{2}$ Jersey/ $\frac{1}{2}$ Friesian	39.2 \pm 0.68 ^C	88.2 \pm 1.65 ^C	522 \pm 8.36 ^B	271 \pm 4.23 ^B

Values in the same column with different superscripts are significantly different ($P < 0.01$)

of the Friesian bulls which averaged 522 kg. Thus there is considerable scope for selecting the better Jersey x type calves for rearing and in rejecting the poorer Friesian type calves. At present, calves are currently selected for rearing on the basis of coat colour and markings. Selection of calves on the basis of weight and frame size may be more appropriate.

Experiment 2

Pasture covers averaged 3407 kg DM/ha at the start of the experiment on 30 May and pre-graze pasture covers averaged 2237 kg DM/ha through until slaughter on 9 November. At the start of the experiment, the 31 Friesian type bulls averaged 436 kg and the 32 Jersey x type bulls averaged 423 kg (Table 2). Over the course of the experiment, the Friesian type bulls averaged 1.19 kg/day compared to 1.13 kg/day for the Jersey x type bulls. At slaughter, average carcass weight of the Friesian bulls was only 7 kg heavier, partly because of the slightly higher dressing out percentage of the Jersey x type bulls (Table 2). There was no significant difference between the breed groups in liveweight, liveweight gain or carcass weight. The Friesian type bulls produced 816 kg liveweight/ha compared with 796 kg/ha for the Jersey x type bulls. Thus, in this study the Friesian type bulls produced an extra 20 kg of liveweight per hectare, an advantage of 2.5% in favour of the Friesian type bulls. However the higher dressing out percentage of the Jersey x type bulls meant that the carcass weight advantage of the Friesian type bulls was reduced to only 0.1% on a per hectare basis.

Experiment 3

Pre-graze pasture cover averaged 2407 kg DM/ha on 14 July, declining to 1659 kg DM/ha on 25 August. Pasture cover averaged 2750 and 3220 kg DM/ha on 28 October and 21 November, respectively. Friesian type bulls averaged 199 kg and Jersey x type bulls averaged 185 kg at the start of the experiment. Friesian type bulls were significantly heavier at the start and finish of the experiment ($P < 0.001$) (Table 3). During the first 76 days of the trial (i.e., over winter), liveweight gain differences between the two groups were quite marked, at 0.83 and 0.62 kg/day for Friesian type and Jersey x type bulls respectively. Over the full 313 days of the experiment, the liveweight gain differences were less marked, with Friesian type bulls growing at 0.97 kg/day compared to 0.90 kg/day for the Jersey x type bulls ($P < 0.001$). The slower growth rates of the Jersey x type bulls during the winter appeared to be associated with greater activity (e.g., riding) and muddier residuals than was occurring in the adjacent lanes of Friesian type bulls. Whether this is a result of inherent behavioural differences between the breeds or attributable to the greater number of animals in each lane is not clear.

Bulls were maintained in their lanes from 9 June to 20 December and the total liveweight production per hectare was 1141 kg from the Friesian type bulls and 1151 kg from the Jersey x type bulls. In this situation Jersey x type bulls produced approximately 1% more liveweight gain/ha. From 20 December to 18 April, the size of each lane was increased equally so it has not been possible to calculate production per hectare

Table 2 Liveweight, liveweight gains (LWG) and carcass weights of rising 2-year-old Friesian and Jersey x bulls stocked at a similar liveweight per ha and farmed in a Technosystem between May and November. Values in parentheses are \pm SEM.

Breed	Number of bulls	Start weight (kg)	Finish weight (kg)	LWG (kg/day)	Carcass weight (kg)	Dressing out %	LWG/ha
Friesian	31	436 \pm 5.76	631 \pm 6.87	1.19 \pm 0.04	340 \pm 4.87	53.8	816
Jersey x	32	423 \pm 7.69	607 \pm 9.75	1.13 \pm 0.03	333 \pm 6.28	54.8	796
Significance (ns = $P > 0.05$)		ns	ns	ns	ns		

Table 3 Liveweight and liveweight gains (LWG) of rising 1-year-old Friesian and Jersey x bulls stocked at a similar liveweight per ha and farmed in a Technosystem between June and April. Values in parentheses are \pm SEM.

Breed	Number of bulls	Start weight (kg)	Finish weight (kg)	LWG (kg/day)	LWG (kg/ha) ¹	Total LWG (kg/mob) ²
Friesian	43	199.1 \pm 2.38	501.0 \pm 5.31	0.97 \pm 0.02	1141	12982
Jersey x	46	184.8 \pm 2.87	465.7 \pm 6.32	0.90 \pm 0.03	1151	12922
Significance ($P < 0.001$)		***	***	***		

¹Liveweight gain per hectare between 9 June and 20 December

²Total liveweight gains of each breed group between 9 June and 18 April 2000. Extra areas were allocated to each group on 20 December 2000 so it was not possible to calculate total per hectare production over the whole experiment.

over the whole period. Nevertheless, total areas available to each paired replicate (lane) were similar and the comparable liveweight gain figures over the experimental period were 12 982 kg for the Friesian type and 12 922 kg for the Jersey x type bulls. This represented an advantage of 0.5% for the Friesian bulls.

Summary

Although Friesian type bulls generally outperformed Jersey x type bulls on a per-head basis, there was considerable overlap in performance in animals within the Friesian type and Jersey x type genotypes. The prejudice against calves which are not marked as typical "Friesian type" means that calves which could be reared for bull beef production are being slaughtered as bobby calves.

When the two breed types were stocked at a similar liveweight per hectare there was very little difference in terms of per-hectare production. This reinforces the findings of Everitt & Ward (1974) that an increased stocking rate of lighter Jersey x Friesian bulls can achieve a similar output of carcass weight per hectare to Friesian bulls. It also confirms our belief that there is likely to be little or no difference between the breeds in the efficiency of converting grass to carcass weight. Jersey x type carcasses are likely to be slaughtered in lighter (and less lucrative) carcass weight grades, thus the purchase cost of store bulls needs to reflect this. As an example, the Jersey x type bulls in Experiment 1 were, on average, 20 kg lighter than the Friesian type bulls and tended to have more individuals in the lighter carcass weight ranges (Table 4). As of 27 June 2001, the penalty was 5c/kg carcass for each carcass weight range (Table 4). An overall analysis of the carcass weights for Experiment 1 but using recent prices, indicates that the overall penalty for the Jersey x type bulls in Experiment 1 would be 4 cents/kg. Thus the Jersey x type bulls in Experiment 1 which averaged 271 kg carcass weight would need to have been purchased at a discount of approximately \$11/head to cover the penalty attributable to lower carcass

weight ranges. Current discounts for Jersey x type bulls are well in excess of this and may reflect the difficulties in re-selling Jersey x type bulls and perceived behavioural problems with these bulls. It must also be emphasised that the profitability of Jersey x type bulls is very sensitive to the discounts applying to the various weight ranges.

In Experiment 1, ½ Jersey x Friesian calves were heavier than 35 kg at 4 days of age when procured for rearing. Calf weights were not available for calves in Experiments 2 and 3 nor was the precise percentage of Jersey blood. However, it can be reasonably expected they were of a suitable size when purchased for rearing (e.g., over 35 kg in liveweight). These experiments and findings pertain to Jersey x type calves of a reasonable birthweight. Light birthweight calves more likely to be slaughtered in very light weight ranges (e.g., <220 kg) and historically the penalty for these lighter carcasses has been quite marked.

Given the crossbred nature of the New Zealand dairy herd, coat colour does not seem to be the most appropriate method of selecting or rejecting calves for rearing. Since all AB dairy calves can be assigned a breeding value (BV) for liveweight based on the performance of their parents, this may provide a better mechanism than coat colour for identifying potentially better performing calves. At present, the best method of selecting a calf for rearing is still likely to be based on weight and frame size.

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Table 4 Distribution of carcass weights of Friesian and ½ Jersey/½ Friesian bulls slaughtered in Experiment 1. Indicative prices for the different weight ranges are as at 27 June 2001.

Weight range	Price/kg–27/6/01 (schedule plus premiums)	Friesian Number in weight range	Friesian Mean carcass weight (kg)	½ Jersey/½ Friesian Number in weight range	½ Jersey/½ Friesian Mean carcass weight (kg)
195.5–220.0	3.83	1	208.5	1	208.6
220.5–245.0	3.88	1	239.6	4	234.9
245.5–270.0	3.93	6	260.1	13	258.1
270.5–295.0	3.98	23	282.2	16	283.7
295.5–320.0	4.03	18	304.8	5	302.8
320.5–345.0	4.08	5	336.9		

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