



FACT SHEET

JUNE 2014

USING PKE BLENDS TO IMPROVE YOUNG CATTLE GROWTH RATES

Summary

Growth rates of young cattle are often poor during summer/autumn when pasture quality is relatively poor and animal health challenges are high.

Two trials where a palm kernel extract (PKE)/maize blend was fed to spring born Friesian bull calves during summer/autumn have demonstrated that this supplement can be an effective means of supporting young cattle growth. Responses were similar across two very different years (one wet and one dry). Average response was 0.31 kg LWG/kg supplement, though 40% of this response was lost after supplementation ceased. Taking into account this post-supplement loss made the feeding of a PKE blend in these studies marginally economic. However, other benefits such as lower losses and earlier slaughter may add to the economic argument for supplementation.

A third study where PKE and PKE blends were fed to older more robust cattle showed a poor response to supplement. This trial indicates that feeding supplement when pasture is plentiful to older cattle may not be economical.



Plentiful pasture during the 2012 trial

Project background

'Finished by 20 Months' is a Beef + Lamb New Zealand project supported by the MPI Sustainable Farming Fund and the Hine Rangi Trust. This project focused on how Northland beef farmers might improve farm profitability and sustainability through growing cattle faster and finishing them at a younger age.

Increasing young cattle LWG provides improvements in:

- Feed Conversion Efficiency
- Meat quality
- Less pugging damage (fewer big animals going through a second or third winter)
- Animal health and welfare
- Potentially more profitable, resilient and sustainable farm systems

The study reported in this paper focused on how PKE blends might be used to improve young cattle growth rates.

Introduction to PKE and PKE blends

On its own PKE is not very palatable. Stock can be slow to start eating it if they have not received a hard feed such as PKE previously. To improve palatability it can be blended with other grains such as rolled maize or barley, commonly at a ratio of 70% PKE/30% other grain. A blend such as this will increase the metabolisable energy but reduce protein. Generally it is recommended that PKE makes up less than 50% of the diet.

PKE and PKE blends are commonly fed in troughs or trailers. Feeding on the ground is generally considered to have higher levels of wastage.

Sponsorship of the product used in this trial work was provided by NRM.



Leaf trial *Matakohe, Northland*

Key findings

- PKE/kibbled maize blend appears a reliable means of improving LWG in young cattle during two contrasting years (one wet and one dry)
- Responses have averaged 0.31 kg of additional LWG/kg supplement fed. This costs out at around \$1.60/kg additional LWG
- Approximately 40% of the additional LWG was lost in the post-supplement period which increases the cost of to around \$2.20/kg additional LWG
- Responses to supplement appear fairly consistent regardless of pasture conditions
- Feeding higher levels of PKE blend may not always result in higher LWG
- Other benefits may be required to make feeding economic e.g. lower losses, earlier finishing, pasture substitution

Background

Phillip & Julia Leaf farm breeding ewes and Friesian bulls at Matakohe, Northland. Their bull finishing system usually consists of buying in spring-born calves and finishing them at 22 - 30 months of age. Getting calves through their first summer and autumn has been a challenge historically, somewhat due to other high priority stock on the farm, such as lambs.

Bull calves are vulnerable during their first summer/autumn. Calf losses have been relatively high in some years, mainly due to misadventure as a result of grass staggers. In recent years Philip has fed PKE blends to support calves during summer/autumn which has seemed to control staggers and markedly reduced losses. This trial work investigates the effect of a PKE blend on calf LWG, mortality and economic benefit.

Trials

Two trials were undertaken to determine the effect of feeding a PKE/Kibbled Maize blend to spring born bull calves during summer/autumn. Treatments are summarised in table 1 below. Treatments were replicated twice.

Table 1. Trial details

Trial 2012 (simplified) Supplementing with PKE/Maize blend (70:30)

1. Pasture only
2. 0.8 kg/head/day for 16 weeks Feb-May
3. 1.6 kg/head/day for 16 weeks Feb-May

Trial 2013 Supplementing with PKE/Maize blend (70:30)

1. Pasture only
2. 1 kg/head/day for 8 weeks Feb-Mar
3. 1 kg/head/day for 9 weeks Apr-May
4. 1 kg/head/day for 17 weeks Feb-May

Calves were fed their daily allowance in feed troughs every morning. Spring born bull calves were rotated around on easy/moderate hill land with no other stock cleaning up behind.

Pasture conditions were good during the 2012 study due to a wet summer with average pre- and post-graze pasture covers of 2857 and 1838 kg DM/ha respectively.

This was contrasted with a dry summer/autumn during the 2013 study with average pre- and post-graze pasture covers of 2138 and 1334 kg DM/ha respectively. During the 2013 study some baleage was provided to all treatments for 6 weeks during early autumn to reduce the effects of the drought. Pasture conditions were similar for all treatments within each of the trials.



Calves eating their supplement despite abundant pasture

Liveweight responses to PKE/maize blend

2012 trial

In the 2012 trial, calves receiving pasture only grew 0.57 kg LWG/day. This is better than would normally be expected during this period on hill land, due to plentiful quality feed in a wet summer. Despite good pasture levels, calves receiving 0.8 kg PKE blend/head/day grew 0.93 kg LWG/day and calves receiving 1.6 kg PKE blend/day grew at 0.84 kg LWG/day. The lower LWG of the higher supplement level was surprising, possibly due to calves becoming reliant on the supplement and waiting for feed rather than grazing

Figure 1. Average liveweight of treatment during the supplemented period of the 2012 trial

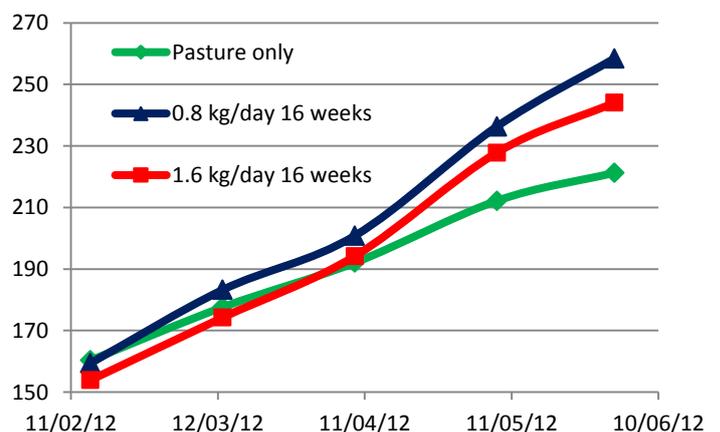


Table 2. Liveweight gain, liveweight advantage over pasture only treatment and liveweight advantage retained in December

	Kg LWG/day during trial period	Liveweight advantage 1st June	Liveweight advantage retained 12th December
Pasture only	0.57		
0.8 kg PKE blend/day	0.93	38 kg	30 kg
1.6 kg PKE blend/day	0.84	29 kg	12 kg

Feeding stopped at the end of May and all cattle were remixed into grazing groups for the winter and spring. By early December the liveweight advantage of the supplemented treatments had reduced with the pasture only treatment showing 'compensatory gain'. This was especially so with the 1.6 kg feed treatment which had lost most of the liveweight advantage during winter/spring.

2013 trial

The 2013 trial was conducted during a drought. Pre-grazing pasture covers were around 2000 kg DM/ha and residuals under 1400 kg DM/ha. Calves on pasture only grew 0.19 kg LWG/day while the supplemented treatments showed additional LWG in proportion to the supplement provided.

Figure 2. Average liveweight (kg) of treatment during the supplemented period of the 2013 trial

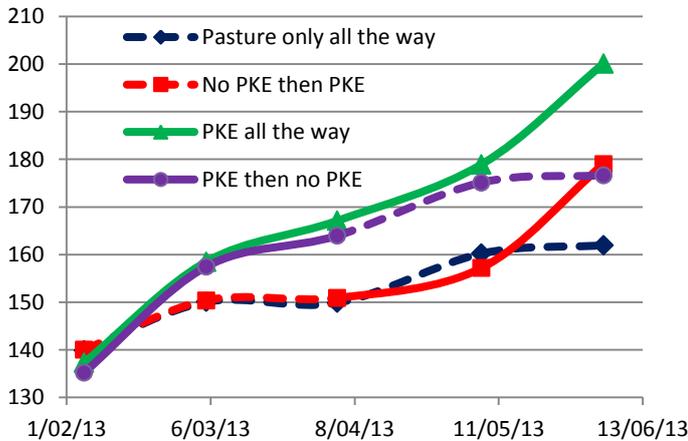


Table 3. Liveweight gain, liveweight advantage over pasture only treatment and liveweight advantage retained in December

	Kg LWG/day during trial period	Liveweight advantage 4th June	Liveweight advantage 29th October
Pasture only	0.19		
1 kg PKE blend/day Feb-Mar	0.33	17 kg	10 kg
1kg PKE blend/day Apr-May	0.35	19 kg	14 kg
1kg PKE blend/day full 17 weeks	0.53	41 kg	29 kg

As in the previous trial, by late October some of the liveweight advantage of the supplemented treatments had disappeared.

Economics of supplementation

Cost of PKE/maize grain blend (70:30) = \$420/tonne plus \$80/tonne assumed feeding cost = \$500/tonne.

The table below shows the response from the different treatments and the calculated cost of the additional LWG that the supplement provided. The final column shows the cost of the LWG advantage that was retained as of December 2012 and late October 2013 (as some of the advantage was then lost after the feeding stopped).

Overall, responses averaged 0.31 kg LWG/kg supplement fed. This is marginally economical if you value the extra liveweight gain at store market value. The loss of some of this advantage post feeding would mean that it may become uneconomical when calculated on a LWG basis only.

Additional LWG/kg PKE blend, cost of that LWG on the basis of \$500/tonne at the end of the supplement period and cost on the basis of retained LWG 4 - 6 months later.

Table 4. Additional LWG/kg PKE blend, cost of that LWG on the basis of \$500/tonne at the end of the supplement period and cost on the basis of retained LWG 4 - 6 months later.

Trial, feeding level/head and timing of feed	Additional LWG/kg PKE blend fed	Cost \$/kg additional LWG	Cost \$/kg additional LWG retained
2012 trial 0.8 kg/day	0.42 kg	\$1.17	\$1.47
2012 trial 1.6 kg/day	0.16 kg	\$3.06	\$7.14
2013 trial 1.0 kg/day Feb-Mar	0.33 kg	\$1.54	\$2.08
2013 trial 1.0 kg/day Apr-May	0.30 kg	\$1.68	\$2.14
2013 trial 1.0 kg/day Feb-May	0.34 kg	\$1.46	\$2.95

Many farmers report good responses to straight PKE which would have a significantly lower cost than the blended product, though palatability is reduced. It would be expected that responses to straight PKE may be slightly lower than a blend, however it is likely that the cost savings would more than compensate for this.

Additional benefits of supplementation

Overall, the economic response from feeding during this trial was marginal. However there are other potential benefits from use of supplements that are not considered in these results. These include:

- Decreased calf deaths have been reported as a result of feeding PKE blends. No significant losses occurred in either of the trials, though lower incidence of grass staggers was noted in the supplemented calves
- Earlier finishing may provide additional benefits within the farm system. This is dependent on a variety of factors within the farm system
- Pasture substitution (when eating supplement cattle usually eat less pasture) provides a saving of pasture (not taken into account in this analysis)
- Supplement contains nutrients that add to soil fertility (approximate value \$30/tonne)

Ludbrook trial

Ohaeawai, Northland

Key findings

- This trial showed a poor LWG response to supplementation when older and more robust cattle were under relatively good pasture conditions
- Using a higher quality/higher cost PKE blend improved palatability, however showed no improvement in LWG response compared to straight PKE
- Supplementation within this study was uneconomical

Background

Roger and Carole Ludbrook farm 262 ha effective near Ohaeawai, Northland. They run a breeding cow herd on the steeper proportion of the farm and finish cattle on the easier areas – mainly bulls. One of the classes of stock farmed is autumn born Friesian bulls. These are targeted to finish before their second Christmas, however during difficult years the targeted weights may not be achieved leading to later slaughter which puts pressure on summer feed supply and times in with a lower schedule.

Roger has used a formulated meal previously to support spring born calves during the summer/autumn, with seemingly good results. Whether similar responses could be achieved with straight PKE or PKE blends was debated. This study involving autumn born cattle investigated the use of three different supplements to improve bull growth rates.

Trial details

A trial was undertaken during summer/autumn 2014, investigating three different supplements to autumn born bulls. A line of bulls were split into 4 mobs and grazed on adjacent blocks at 4/ha.

Treatments:

1. Pasture only
2. Straight PKE at 1.5 kg/head/day – cost \$384/tonne
3. PKE/kibbled maize blend (70:30) at 1.5 kg/head/day – cost \$528/tonne
4. Formulated meal (60% PKE, 15% protein) at 1.5 kg/head/day – cost \$523/tonne

Pastures were predominantly kikuyu based and rainfall was relatively high during the trial period resulting in good pasture covers and reasonable quality of pasture throughout the trial.



Bulls on good pasture levels during the study

Liveweight responses

Pasture only cattle showed good liveweight gains of 0.85 kg/day throughout the trial period. This was unexpected as although pasture quantity was good, pasture quality was only moderate due to kikuyu growth. All supplemented treatments showed similar LWG of around 0.96 kg/day during the supplemented period.

Figure 3. Average liveweight (kg) of treatment during the supplemented period

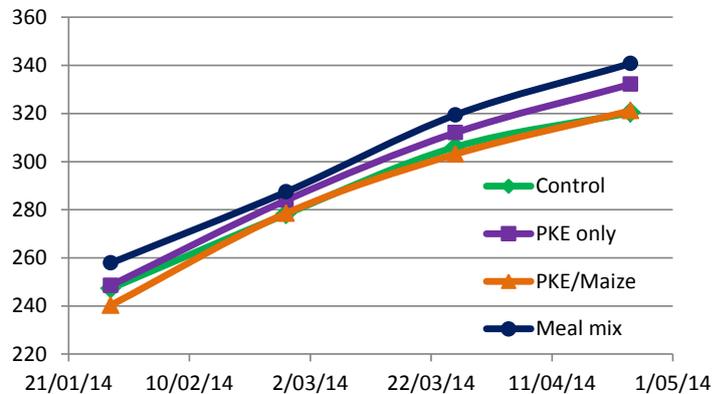


Table 5. Liveweight gain during the trial period and liveweight advantage compared to pasture only treatment.

Treatment	Kg LWG/day during trial period	Liveweight advantage over 86 days
Pasture only	0.85	
1.5 kg PKE/head/day	0.97	11 kg
1.5 kg PKE/Maize blend/day	0.94	8 kg
1.5 kg formulated meal/day	0.96	10 kg

Response to supplement was low at an average of 75g LWG/kg supplement fed. There was no significant difference in LWG between types of supplement, however it should be noted that the cattle were less aggressive in eating the straight PKE compared to the other blended feeds.

During the trial period pastures averaged 71% green leaf and 9.4 MJ ME/kg DM. Pre-graze pasture mass averaged 2760 kg DM/ha and post-graze 1960 kg DM/ha. Though this would indicate a medium quality pasture, availability was high and therefore all cattle were under relatively high levels of nutrition from pasture, as indicated by the LWG of the pasture only treatment. A low response to supplement should be expected when a medium quality pasture is replaced with a medium-high quality supplement. The lower response to supplement compared to the previous studies may also be somewhat due to these autumn born calves being better able to handle the summer/autumn pasture conditions compared to the younger calves in the previous studies.

The use of supplement within this trial was far from economical. This study indicates that supplementation should be avoided when pasture supply is plentiful. It also issues a precaution to feeding supplement to older more robust cattle when nutrition is not challenged. Use of a higher quality and higher cost PKE blend showed no advantage compared to straight PKE.

For more information

Chris Boom, *AgFirst Northland* E: chris.boom@agfirst.co.nz

Factsheets are made possible by sheep and beef farmer investment in the industry. Beef + Lamb New Zealand is not liable for any damage suffered as a result of reliance on the information contained in this document. Any reproduction is welcome provided you acknowledge Beef + Lamb New Zealand as the source.