beef+lamb new zealand

FACT SHEET

APRIL 2020

HEIFER NUTRITION EFFECTS ON CALVING EASE, GROWTH AND REBREEDING

This fact sheet outlines a study of first-calving, two-year-old heifers to see if their pregnancy weight can be manipulated to reduce the birthweight of the calf.

It found that maternal liveweight changes in the first trimester of pregnancy had no consistent effect on calf birthweight.

The impact of assistance at calving on heifer and calf liveweight, milk yield and heifer rebreeding was also investigated. The chance of calving difficulty increased with heavier birthweights but was not affected by calf body dimensions. There was no difference in the performance of assisted heifers and calves during the rearing period. However, intervention in the trials was perhaps more prompt than in a commercial situation.

Calf birthweight is the prime reason for calving difficulty in two-year-old heifers. When the calf is too big to allow a normal delivery, it is known as fetomaternal disproportion.

It was proposed that reducing calf birthweight relative to the liveweight of the heifer would result in fewer assisted calvings. B+LNZ funded Massey University to conduct three trials.

LIVEWEIGHT GAIN TREATMENTS

TRIAL ONE

Heifers were fed for moderate or low liveweight gain for the first 90 days of pregnancy then fed to achieve the same liveweight at calving. Birthweight of calves was similar for the two treatments.

TRIAL TWO

Heifers were fed for high or moderate liveweight gain for 10 days prior to insemination, and for moderate liveweight gain or liveweight loss for the first 90 days of pregnancy. This created four treatment groups: highmoderate (HM), high-loss (HL), moderate-moderate (MM), and moderate-loss (ML).

Table A: Daily weight gain/loss pre and post mating for the four heifer groups in trial two (note: shaded = loss)

	HL	HM	MM	ML
10 days up to conception (kg/day)	1.22	1.22	0.56	0.56
First trimester i.e. 93 days (kg/day)	-0.11	0.54	0.54	-0.11

The rate of liveweight gain was greater for the second and third trimesters of pregnancy for the HM and MM heifers than for the HL or ML heifers. The HM and MM heifers were heavier at calving than the HL or ML heifers.

Calf birthweight was greatest for the HM and MM treatments, intermediate for the ML heifers and least for the HL heifers. Calf birthweight relative to heifer liveweight was less for the HL treatment than for the other three groups.

TRIAL THREE

Heifers were fed for high liveweight gain prior to insemination, then for moderate liveweight gain or liveweight loss for the first 90 days of pregnancy, or for liveweight loss for the first 42 days of pregnancy. Heifers were grazed in one herd for the remainder of pregnancy. Calf birthweight was similar for all treatments.

RESULTS

- Restricting nutrition in the first trimester does not affect birthweight
- The heifer buffers the foetus
- No lasting impact on rebreeding
- Calves light at birth are lighter at weaning
- Calf birthweight relative to heifer size, not body dimensions, influences dystocia

BIRTHWEIGHT OF CALVES

A calf gestation period is about 282 days, depending on genetics. This can be broken into three trimesters of 94 days each.

Liveweight gain of heifers in the first trimester of pregnancy did not influence birthweight. If total liveweight gain during pregnancy was similar between treatments, moderate compared with low liveweight gain of the heifer in the first trimester of pregnancy did not affect calf birthweight.

Similarly, low liveweight gain or liveweight loss for the first 42 or 90 days of pregnancy did not affect birthweight of calves compared with calves born to heifers fed for moderate liveweight gain during that time.

The heifers in these low treatments showed an effective ability to buffer nutrient supply to the foetus. They produced calves of similar birthweight to those born to heifers in the moderate treatment. This was despite going through a period of substantial liveweight loss followed by a period of considerable compensatory growth on the same pasture allowance as heifers in the moderate treatment.

The absolute nutrient requirement of the foetus in early gestation is very low, so it is possible that heifers can buffer it at this stage.

In the second trial, calves born to heifers with high liveweight gain pre-insemination and lost liveweight in the first trimester of pregnancy delivered calves that were 3.2kg lighter than calves born to heifers in the other treatments. The attempt to repeat this effect in trial three was unsuccessful. This indicates the high to low switch at insemination on birthweight was a chance effect. Another theory is that in order for differences in birthweight to result from restriction of maternal liveweight gain in early pregnancy, liveweight gain must be relatively low throughout pregnancy.

LIVEWEIGHT OF CALVES

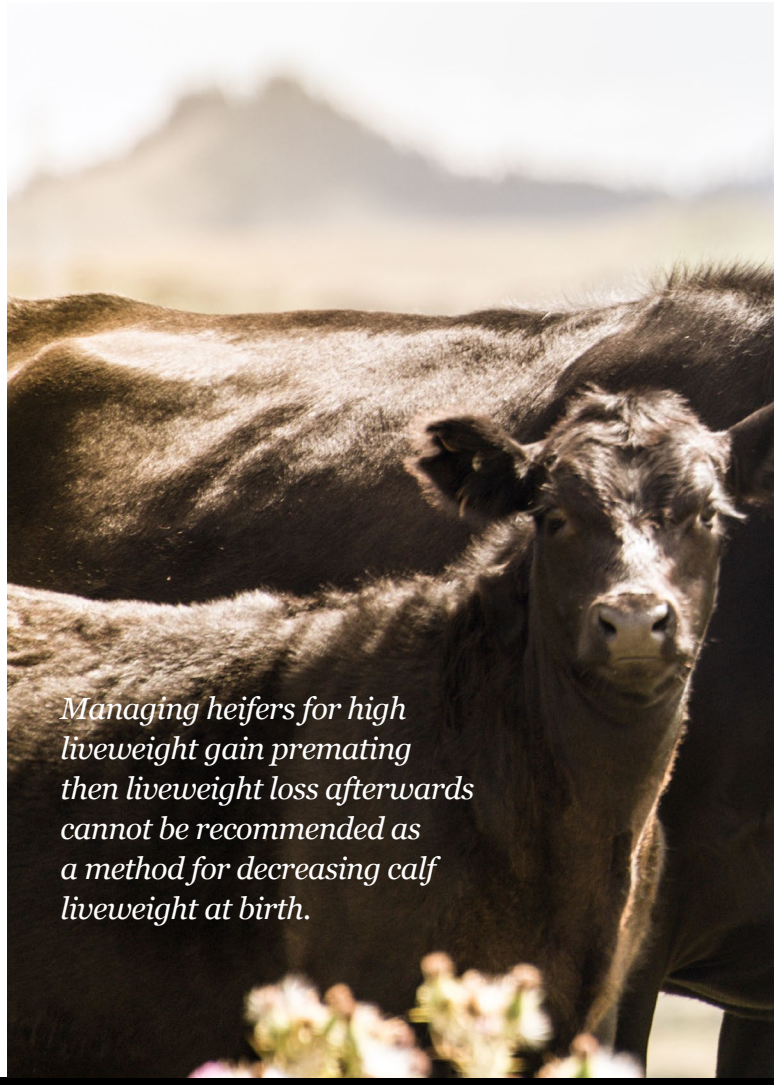
From a production perspective, the effect of nutritional treatments on the birthweight of the calf can not be considered in isolation. It is important to also study the consequences on production, particularly calf weaning weight, their subsequent growth, and rebreeding of the dams. Calves that were born at similar birthweight generally had similar liveweight throughout the rearing period.

Likewise, the two heavy groups of calves in trial two remained heavier than the two light groups of calves at least until 16 months of age.

SUBSEQUENT PERFORMANCE OF THE HEIFERS

There was no lasting impact of liveweight change during the first trimester of pregnancy on the liveweight of heifers. Days to calving and inter-calving interval were not affected and pregnancy rate was similar among treatments.

This indicates that if 15-month-old heifers were fed for varying rates of liveweight gain during the first trimester of pregnancy, there was no lasting impact on liveweight or rebreeding success.



Managing heifers for high liveweight gain premating then liveweight loss afterwards cannot be recommended as a method for decreasing calf liveweight at birth.

FACTORS AFFECTING ASSISTANCE AT CALVING

In all trials, calves born to assisted heifers were heavier at birth than non-assisted calves. This shows the importance of birthweight in calving difficulty. There were no differences in liveweight at any other age between surviving assisted and non-assisted calves. Surviving assisted calves were slower than nonassisted calves to stand and suckle after birth, possibly indicating impaired viability. Milk intake of the calves was generally not affected by assistance at birth.

These results indicate that providing prompt assistance at calving should not have a negative impact on subsequent performance.

Body dimensions of the calves did not contribute to the probability of assistance at birth after adjustment for birthweight. The sires used in trial three had divergent estimated breeding values for direct calving ease, but similar genetic merit for birthweight. Yet even calves from sires identified as above and below average breeding values for direct calving ease showed no effect of body dimensions on the probability of assistance at birth.

IMPLICATIONS FOR FARMERS

Restricting maternal nutrients in the first trimester is unlikely to restrict foetal growth and decrease birthweight of the calf. In fact the most effective way to minimise dystocia in two-year-old heifers may be to ensure the heifer also grows during this time. This decreases the risk of foetal-maternal disproportion.

Secondly, considerable variation in heifer liveweight gain in early pregnancy (and by inference, feed intake) can be expected to have little effect on their subsequent performance.

Thirdly, if prompt assistance is provided to affected heifers, assistance at calving should not affect the performance of surviving, affected animals during the rearing period.

This information is useful for making management decisions when faced with the inevitable variation from year to year in the quantity and quality of pasture available to beef cattle herds in New Zealand.

SIRE SELECTION BEST OPTION

At the present time, the most effective method available to beef cattle farmers to minimise the incidence of assisted calving in first-calving, two-year old beef heifers is to select service sires of appropriate genetic merit for birthweight and direct calving ease.

In other words, sires with low birthweight EBV and more positive direct calving ease EBV.

GROW OUT HEIFERS

Heifers should be well grown before joining.

PROMPT CALVING ASSISTANCE

Frequent observation and prompt provision of assistance during calving reduces the chance of the cow and calf growth and production suffering later on.

RELATED RESOURCES

- Fact sheet 171 - Managing beef cows prior to and during mating
- Fact sheet 164 - Managing heifers prior to and during mating
- Fact sheet 74 - Nutrition of the beef cow post-weaning
- Fact sheet 98 - Condition scoring for beef cows
- Better Beef Breeding
* 5 Steps to finding the best bull for your operation

More information

For further information freephone Beef + Lamb New Zealand on 0800 BEEFLAMB (0800 233 352) or email enquiries@beeflambnz.com or visit www.beeflambnz.com