This Infosheet covers:

- Calculating average growth rates.
- Factoring the effects of season and region into growth rate planning.
- The influence of a farm system’s production potential on growth rate planning.
- The effects of high growth rates and compensatory growth on achieving targets.

Key points

- Meeting heifer weight-for-age targets should be the focus rather than a particular pattern of growth.
- The average daily growth rate required (kg/head/day) to meet weight-for-age targets can be calculated by dividing the required weight gain by the number of available days.
- Farmers need to consider seasonal feed availability when developing a growth rate plan.
- Any benefit of accelerating growth above a target has yet to be demonstrated through research.
- It is unwise to rely on compensatory growth to meet a target.

Role of a growth rate plan in meeting liveweight targets

Growing heifers well, so that they meet their liveweight targets, can improve farm productivity and profitability. Research trials have identified the weight-for-age targets to optimise reproduction and milk production results. To meet these targets, heifers need to grow at appropriate rates over two years; putting a plan in place will help to achieve this.

There are four steps to achieving the desired growth for heifers (this Infosheet will focus on step 4):

1. Select a mature liveweight for a group of heifers.
2. Set mob weight-for-age targets based on meeting a percentage of the mature liveweight.
3. Set individual weight-for-age minimums.
4. Create an expected, or targeted, seasonal growth rate plan so that heifers achieve their target liveweights.
More information

- For more about why liveweight targets are useful, see Heifer Infosheet 1.1: Benefits of Heifer Liveweight Targets.
- For definitions of mob weight-for-age targets and individual minimum weights, and to find out how to set them, Heifer Infosheet 1.5: Setting Weight-for-Age Targets.
- To find out how to select a mature liveweight, see Heifer Infosheet 1.4: Setting Mature Liveweights.

Heifer growth rates can be used:

- To calculate annual feed requirements when rearing youngstock.
- To plan and manage the feed supply in different seasons.
- To review progress over time, such as when a grazier reports progress to a stock owner, or a stock owner compares performance over a number of years.

Calculating average growth rates

The average daily growth rate (kg/head/day) required to meet weight-for-age targets can be calculated by dividing the required weight gain by the number of available days.

Table 1 shows the average growth rates required to achieve a range of mature liveweights. For example, heifers with a mature cow liveweight of 500 kg, and weaned at 100 kg, need to increase their liveweight by 100 kg (from 100 to 200 kg) in the period from 3 to 9 months of age, a total of 182 days.

100 kg weight gain ÷ 182 days = 0.55 kg/head/day

Table 1. Average growth rates required for August-born calves to achieve their liveweight targets.

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Period</th>
<th>Mature cow liveweight* (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>420</td>
</tr>
<tr>
<td>3 - 7</td>
<td>Nov - March</td>
<td>0.46</td>
</tr>
<tr>
<td>8 - 20</td>
<td>April - April</td>
<td>0.59</td>
</tr>
<tr>
<td>21 - 22</td>
<td>May - June</td>
<td>0.50</td>
</tr>
</tbody>
</table>

* Note: based on 2016 national dairy herd statistics data.¹

The daily growth rates required (kg/head/day) do not change much during the 18-month period from 3 to 22 months of age but in the same period a heifer’s liveweight will increase by a factor of 4.5. The fastest growth period is from birth to 3 months when calves will typically double their liveweight. It takes another 6 months to double their liveweight again.

It pays to take advantage of heifers’ growth potential when they are young and avoid the trap of having to catch up later when animals are less growth-efficient.

### Seasonal and regional growth rates

Heifer growth rates can vary widely by season, region, and year. For example, Table 2 shows the variation found on a South Canterbury farm, grazing spring-born Crossbred and Friesian youngstock.

**Table 2.** Variation in seasonal growth rates on a South Canterbury farm.

<table>
<thead>
<tr>
<th>Year of birth (spring born)</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>First summer (Dec - Feb)</td>
<td>0.55</td>
<td>0.54</td>
<td>0.65</td>
<td>0.69</td>
</tr>
<tr>
<td>First autumn (Mar - May)</td>
<td>0.45</td>
<td>0.48</td>
<td>0.42</td>
<td>0.37</td>
</tr>
<tr>
<td>First winter (June - Aug)</td>
<td>0.49</td>
<td>0.43</td>
<td>0.50</td>
<td>0.46</td>
</tr>
<tr>
<td>Second spring (Sep - Nov)</td>
<td>1.02</td>
<td>1.08</td>
<td>0.86</td>
<td>1.10</td>
</tr>
<tr>
<td>Second summer (Dec - Feb)</td>
<td>0.57</td>
<td>0.71</td>
<td>0.73</td>
<td>0.62</td>
</tr>
<tr>
<td>Second autumn (Mar - Apr)</td>
<td>0.46</td>
<td>0.57</td>
<td>0.54</td>
<td>Contract not completed</td>
</tr>
<tr>
<td>Average 17 month growth rate</td>
<td>0.59</td>
<td>0.64</td>
<td>0.62</td>
<td>-</td>
</tr>
<tr>
<td>Final mob avg. weight 30 Apr</td>
<td>409 kg</td>
<td>429 kg</td>
<td>434kg</td>
<td>-</td>
</tr>
</tbody>
</table>

It is useful to review the heifer growth rates your system can produce to ensure 15 and 22 month targets are met, even if a seasonal growth rate is below the average required. In Table 2, autumn and winter growth rates were lower; however, the higher growth in spring and summer made up the difference so that the final mob average weight target was met. Regardless, a plan should be put in place so that appropriate actions can be taken in the situation where seasonal growth rates turn out to be lower than expected.

In areas where the summer is dry or there is low winter pasture growth, maximising heifer growth rates while feed is available makes sense. Getting heifers above target going into the risk periods gives the greatest chance of reaching weight-for-age targets.
Influence of farm system

As a grazier, knowing the feed production potential of your farm will help in setting a stocking rate and selecting the appropriate breeds to have on the farm. It can also help when establishing expectations between a grazier and the stock owner.

For example, if a farm system is only able to put 300 kg on a heifer over a 17 month contract then it will not be suitable for Friesians which have higher liveweight targets. In this situation the grazer would need to review the way the system is managed, change the stocking rate, or select a different breed to graze.

Graziers measure their system’s production potential in various ways, including:

- Kilograms of weight gained over the contract grazing period.
  - Example: 330 kg of weight gain over 72 weeks (variable contract period).
- Doubling each animal’s weight from arrival to the end of the grazing period.
  - Example: heifer arrives at 225 kg and leaves at 450 kg (12 month contract).
- Specific rates of gain for different seasons.
  - Example: 0.3 kg/head/day in winter, 1.1 kg/head/day in spring, 0.5 kg/head/day in summer, and 0.8 kg/head/day in autumn.

Farmer Viewpoint

We use our farm’s historical heifer daily liveweight gains to predict final weights. Heifer Growth rates vary from month to month but over the year it works out to be quite accurate to predict weight gain over the year.

Contract grazier, 1,000 heifers, Patea, Taranaki

Be realistic about heifer growth based on the seasonal feed supply.

Dairy farmer, 630 cows, Winton, Southland

Every heifer mob has different growth rates, probably in part due to genetics.

Contract graziers, 720 heifers, Oamaru, North Otago

Winter feed supply can be unreliable so we try and get the heifers as heavy as we can going into their first winter.

Contract grazier, 1,200 heifers, Middlemarch, Otago

It is important that animals are above target going into sensitive feed periods for a liveweight buffer to make sure target liveweights are met.

Contract grazier, 230 heifers, Wellsford, Northland
Creating a Heifer Growth Rate Plan

High growth rates

Heifers need to grow quickly enough to reach puberty so they can be mated at 14 - 15 months old. However, any benefits of accelerating growth above targets have yet to be demonstrated through research. In a research trial, high growth before puberty resulted in a long-term milk production penalty\(^2\), or no impact at all. In another study, high growth rates after puberty were not shown to influence milk production.\(^3\) However, it pays to keep in mind that the research trials were able to maintain average growth rates over extended periods of time, which typically does not occur in practice on New Zealand farms (see Figure 1). It is rare that these high heifer growth rates are experienced on farm and the focus should remain on achieving the weight-for-age targets. The risk is higher of missing targets than it is for reducing milk production through high growth rates.

Figure 1. The difference between the growth rates maintained under research conditions (Macdonald et al, Ford and Park) and those on a commercial farm (South Canterbury).

---

**FARMER VIEWPOINT**

I’ve found that if I put newly weaned calves behind a break fence for grazing they only put on 0.5 kg liveweight/day. To get higher growth rates I have the R2 heifers graze after them to clean up.

Contract grazier, 1,000 heifers, Patea, Taranaki

Autumn is the most difficult season for us to grow heifers because it is peak animal feed demand while pasture growth can be variable, depending on the autumn rain.

Contract grazier, 430 heifers, Greytown, Wairarapa

---


**Compensatory growth**

Compensatory growth is well documented in research and backed up by farmer experience. Graziers who regularly weigh stock have noted high rates of compensatory growth after periods of very low growth e.g. 0.3 - 0.4 kg/day. However, compensatory growth can be variable and typically it cannot be sustained over long periods of time. As a result, it cannot be relied upon to make up for previous poor growth.

---

**FARMER VIEWPOINT**

We find that exceptionally well grown calves are difficult to grow through the winter at average growth rates.

Contract grazier, 1,000 heifers, Patea, Taranaki

---

**More information**

- To find out about how to identify underperforming heifers and the causes of low growth, see Heifer Infosheet: Identifying Low Growth in Heifers and Causes for Low Heifer Growth.
- To find out about different weighing systems, see Heifer Infosheet: Weighing Systems for Heifers.
- To find out more about compensatory growth, see Heifer Infosheet: Feeding Crops and Supplements to Heifers.