Causes of Poor Heifer Growth

This Infosheet covers:

- The importance of identifying poor heifer growth.
- The causes of poor heifer growth, some of which will have a temporary and some a permanent effect.
- How to identify the cause(s) of poor heifer growth.

Key points

- If heifer growth is poorer than expected and carries on longer than planned, there is a risk that weight-for-age targets will be missed.
- Poor growth is not uncommon but heifer weights seldom improve or correct without intervention.
- The earlier the cause of poor growth is identified, the sooner remedial action can be taken and the higher the chance of successfully getting heifers back on-track.
- The factors that can contribute to poor growth can be grouped into three categories: genetics e.g. incorrect identification of parents; permanent environment (e.g. poor calf rearing); and temporary environment (e.g. weather conditions).
- When trying to solve a low growth problem, first assess the day-to-day management, then review the management systems and finally check the targets.

Importance of identifying poor heifer growth

An investment in a dairy heifer is an investment in the future success of the farm business. In heifers’ first two years of life the only objective way of gauging their performance is by regularly measuring their liveweight and comparing it to weight-for-age targets. Achieving weight-for-age targets has a beneficial effect on future milk production and reproductive performance.

Heifers need to grow at a particular average rate overall to achieve weight-for-age targets. Their growth rate may vary during the year, and if variations are well managed, liveweight targets can still be met. However, if growth rates are lower than expected and carry on longer than planned, there is a risk that liveweight targets will be missed. The earlier the cause of low growth is identified, the sooner actions can be taken to get animals back on-track as small weight discrepancies can be remedied through good management.
How common is poor growth?

A New Zealand study used data sourced from LIC to compare heifer liveweights to their weight-for-age target, based on liveweight breeding values at 22 months. It was found that 66% of animals were more than 5% behind their target liveweight at 22 months. Given that only 50% of animals should be less than the average within any normally distributed population, this study indicated that poor growth is common in New Zealand. Just because low growth is common, it does not mean that it should be accepted.

What can cause poor growth?

The factors that can cause poor growth rates can be grouped into three categories: genetics, permanent, and temporary environment (see Table 1).

Table 1. Factors which can cause low growth rates.

<table>
<thead>
<tr>
<th>Category</th>
<th>Review question</th>
<th>Possible cause of low growth</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>Is this target or expected growth rate appropriate for this/these animal(s)?</td>
<td>• misidentified parents</td>
<td>Assess heifers at weaning and set appropriate targets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• animal small due to genetics</td>
<td></td>
</tr>
<tr>
<td>Permanent environment</td>
<td>What has this/these animal(s) experienced that will always prevent them from achieving the growth rate target(s)?</td>
<td>• poor calf rearing e.g. colostrum intake, rumen development</td>
<td>Good management practices, including correct feeding and health management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ill health/disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• injury</td>
<td></td>
</tr>
<tr>
<td>Temporary environment</td>
<td>What can be changed now to improve growth?</td>
<td>• feeding</td>
<td>Regular weighing and observation to identify issues promptly (brief periods of low growth are easier to remedy than extended periods)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• health factors e.g. eczema spores, ryegrass staggers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• weather conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• paddock conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• parasite pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• time since feeding</td>
<td></td>
</tr>
</tbody>
</table>

The effects of genetics and the permanent environment last for an animal’s lifetime. Some ongoing day-to-day management and environmental conditions can also have a permanent effect. The influence of each category of factors on an animal’s mature liveweight is shown in Figure 1.

1Handcock, RC, TJ Lopdell, and LR McNaughton. 2016. More dairy heifers are achieving target liveweights. Proceedings of New Zealand Society for Animal Production. 76:3-7
**Dealing with poor growth**

When trying to solve a poor growth problem, first assess the day-to-day management, then review the management systems and finally check the targets (see Figure 2).

To put preventative measures in place, work through the solutions in Table 1 from top to bottom i.e. set realistic targets, put better management systems in place, and actively manage heifers on a day-to-day basis.

**Figure 2.** Diagnostic process for identifying cause of low heifer growth.

<table>
<thead>
<tr>
<th>GENETICS</th>
<th>Feeding/nutrition</th>
<th>Quality, quantity, nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Animal health</td>
<td>Parasites, Clostridia, minerals, other</td>
</tr>
<tr>
<td>PERMANENT ENVIRONMENT</td>
<td>Previous management</td>
<td>Transport, disease exposure, nutrition pre-puberty, other</td>
</tr>
<tr>
<td></td>
<td>Calf rearing</td>
<td>Colostrum, calf care, rumen development, weaning</td>
</tr>
<tr>
<td>TEMPORARY ENVIRONMENT</td>
<td>Genetics</td>
<td>Misidentification, animal genetically small size</td>
</tr>
</tbody>
</table>

Within each category there are a number of factors to investigate (see the following sections).

---

**Genetics**

**Randomisation of gene inheritance**

Random gene inheritance is like a lottery, it is unknown if big, average, or small genes will be inherited.

For example, if a large Holstein-Friesian cow is mated to a Jersey x Friesian bull and gives birth to two heifers, one could be large, and black and white (like its mother), while the other could be solid brown and medium-sized. Based on genetic predictions, these twin sisters would have the same expected growth and liveweight; however, the genes they inherited from their parents are quite different. When animals inherit the predicted genes from their parents the normal variation around the predicted value is +/- 5%. Some animals will fall outside this range, and in the case of size, they may inherit the genes for a larger or smaller size. If they inherit the genes for a smaller size, their growth will be lower than expected. This is why weight-for-age targets are best suited for mobs, as it is too difficult to select a target for an individual.

**FARMER TIP**

We’ve found every mob has different rates of gain, this is probably linked to genetics.

Contract grazier, 720 heifers, Oamaru, North Otago

**Crossbreeding**

Crossbreeding increases the range of weights in a group of animals. The national crossbred population has a greater weight variation than the Jersey or Holstein-Friesian populations. A crossbred mob should still achieve their liveweight targets but the weight gap between the smallest animal and largest animal will be proportionately larger than in a mob of Friesian or Jersey animals.

**Calf identification**

It is easy to misidentify a calf’s dam when several cows have calved. This leads to incorrect genetic liveweight predictions. A New Zealand study on commercial farms found that 23% of heifers’ dams and sires were incorrectly identified. Genetic testing to improve identification can reduce this risk.

**Permanent environment**

Colostrum intake and transfer of passive immunity

Cows transfer disease immunity to their calf in different ways. Passive immunity occurs, but is limited, while the calf is in utero and during the birthing process. Most of the immunity is transferred via immunoglobulins in the colostrum after birth. A calf’s ability to absorb immunoglobulins declines over the first 24 hours, and the best absorption occurs during the first 12 hours. If calves do not get enough colostrum, or it is not high quality, then they will be more susceptible to illness. Natural or genetic immunity is life-long.

**Illnesses**

Some illnesses have a permanent impact on an animal’s growth rates, for example BVD (bovine viral diarrhoea), Johne’s Disease and, in some cases, pneumonia. A veterinarian should be involved in diagnosing illnesses, and prescribing the most appropriate treatments and vaccinations.

---

Rumen development
A calf’s first nutrition comes from colostrum, then milk, which bypasses the rumen and is digested in the abomasum. The rumen takes time to develop, with the type of feed that a calf eats having a large influence on the development of the rumen and rumen papillae. The papillae are small finger-like projections that cover the interior surface of the rumen, increase its surface area, and allow it to absorb nutrients from forages. If the papillae are not fully developed when the calf is weaned, then its ability to absorb the nutrients necessary for growth will be compromised.

Feeding
The type and quality of feed supplied to heifers is usually one of the easier aspects to control. However, heifers may gain access to poisonous plants (e.g. ragwort or tutu), or consume toxic amounts of feed (e.g. grains), or ingest substances that affect rumen function or lead to ill-thrift (e.g. fungi and moulds in silage, or mud while grazing winter crops).

Temporary environment

Feeding
The quantity and quality of feed both affect heifer growth. A Beef + Lamb New Zealand study found that low quality feed was the most common cause of ill-thrift, or unexpectedly poor growth, in beef animals.\(^5\) Dry conditions and variable supplement quality can affect feed quality.

Animal health
It is important to have an animal health programme in place which includes regular observation and monitoring. Animal health issues, such as parasitism compounded by drench resistance, or short-term illnesses such as pneumonia, will still occur but a good programme will identify them promptly. A veterinarian should be consulted on all animal health matters.

Environmental conditions
In very wet or cold conditions heifers may use much more energy through shivering or heat loss. Persistent wet conditions or snow reduce feed utilisation, leading to heifers being unable to consume the necessary feed to achieve required growth rates. Some heifers do not forage for feed when they are shifted from flat to hill country farms, and so do not meet growth objectives.

Competition within a group
There are many reasons why animals may not compete well in a group, for example, because of their size, age, ill-health or temperament. Depending on farmer preference, these animal(s) can be managed preferentially or culled.

---

We group our heifers based on weight because we work with large scale dairy farms. Heifers arrive in December and we draft them into weight based mobs in mid-January and then re-draft on weights going into winter.

Contract grazier, 2,400 heifers, Mossburn, Southland

There will always be weight differences within a group, no matter what we've done there is always a 100 kg difference between the top and bottom of our crossbred lines when heifers go home at 22 months.

Contract grazier, 720 heifers, Oamaru, North Otago

More information

- For more about animal health programmes see Heifer Infosheet Heifer Health Plans.