Feed management for growing heifers

This Infosheet covers

- The purpose of creating a feed plan.
- Creating a plan to meet liveweight targets.
- Creating seasonal/annual feed budgets.

Key points

- When putting a plan together setting key weight-for-age targets is more important than focussing on a pattern of liveweight gain.
- Feed planning is important as heifer feed requirements do not match the seasonal pasture supply.
- Setting targets is an important part of feed planning and includes:
  - Setting mature liveweight targets.
  - Determining the required weight change between 3 and 22 months.
  - Calculating the average heifer growth rates required to meet liveweight targets.
  - Adapting liveweight gain expectations to take account of changes in feed supply.

The purpose of feed planning

Planning and active management are needed so that heifers achieve their required growth rate to meet liveweight targets. This is because the seasonal pasture supply on most New Zealand farms does not match up with heifer feed requirements.

There is an element of art and science to successful feed allocation, with many factors to consider. Pasture growth rates vary during a season and between regions, and feed quality, pasture species, sward densities and dry matter levels all vary between, and within, paddocks.

Feed budgeting is used to predict feed shortfalls during the season, and to highlight deviations from expected feed supply, which could put achieving heifer liveweight targets at risk.

**Target**
The feed plan lines up with liveweight gain expectations.

**FARMER VIEWPOINT**

Our farm’s natural feed supply is not reliable enough. We are improving reliability through irrigation and cropping (kale crop, fodder beet, oats, rye corn and maize).

Contract graziers, 720 heifers, Oamaru, North Otago
**Heifer growth rates and liveweight targets**

It is important to set realistic heifer liveweight targets. These must be based on expected mature liveweight of your heifers, as well as the daily rate of growth required to achieve this target, with age-related targets identified along the way.

A four-step method can be used to plan the heifer dry matter intake required to achieve liveweight targets:

1. **Set mature liveweight target and required “weight for age” targets.**

   Set a mature liveweight target and then set the required “weight for age” targets required for a heifer to meet this weight. These are a percentage of the mature liveweight that she needs to reach by a certain age i.e. 20%, 30%, 60% and 90% of mature liveweight by 3, 6, 15 and 22 months of age.

   More information
   - See Heifer Infosheet: Selecting Mature Liveweights and Setting Weight-for-Age Targets.

2. **Use these targets to determine the required weight gain between 3 and 22 months.**

   For example: A 3-month old heifer of 100kg, with a mature liveweight target of 500 kg, will need to reach 90% of her mature weight by 22 months, or 450 kg, this includes the weight of pregnancy. Therefore, she needs to gain: 450 kg – 100 kg = 350 kg

   More information
   - See Table 1 and Heifer Infosheet: Setting Weight-for-Age Targets.

3. **Calculate the average daily growth rate required to achieve the 22 month liveweight target**

   **Example calculation:**

   From the example above, the heifer needs to achieve 350 kg weight gain across 530 days of grazing (1 Dec-1 May), suggesting an average growth rate of 0.66 kg/day is required. Table 1 gives examples of target weights and DMI based on expected mature liveweight, the row for this example is highlighted. More information

   More information
   - See Table 1 and Heifer Infosheet: Creating a Heifer Growth Plan.
Table 1. Feed eaten requirement for dairy heifers (kg DM/day) based on mature liveweight (Lwt) and age.

<table>
<thead>
<tr>
<th>Mature Lwt (kg)</th>
<th>Average growth rate per day (kg/day)</th>
<th>Age (months)</th>
<th>3</th>
<th>6</th>
<th>15</th>
<th>22 (av. 6 weeks pre-calving)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight for age (kg DM/d)</td>
<td>Intake (kg DM/d)</td>
<td>Weight for age (kg DM/d)</td>
<td>Intake (kg DM/d)</td>
<td>Weight for age (kg DM/d)</td>
<td>Intake (kg DM/d)</td>
</tr>
<tr>
<td>400</td>
<td>0.53</td>
<td>80</td>
<td>2.3</td>
<td>120</td>
<td>3.0</td>
<td>240</td>
</tr>
<tr>
<td>450</td>
<td>0.59</td>
<td>90</td>
<td>2.6</td>
<td>135</td>
<td>3.3</td>
<td>270</td>
</tr>
<tr>
<td>500</td>
<td>0.66</td>
<td>100</td>
<td>2.9</td>
<td>150</td>
<td>3.6</td>
<td>300</td>
</tr>
<tr>
<td>550</td>
<td>0.72</td>
<td>110</td>
<td>3.2</td>
<td>165</td>
<td>4.0</td>
<td>330</td>
</tr>
<tr>
<td>600</td>
<td>0.79</td>
<td>120</td>
<td>3.5</td>
<td>180</td>
<td>4.4</td>
<td>360</td>
</tr>
</tbody>
</table>

1Based on calculations from Ian Brookes, Growing replacement heifers. Massey University, Palmerston North

Notes:

- Intake is feed eaten. Adjust feed offered for expected utilisation, utilisation will be lower in unfavourable weather so feed offered needs to be higher.
- Intake does not include walking/hills, add additional 5% for rolling to steep land.
- Intake assumes feed quality of 11 MJ ME/kg DM. Add/subtract 5% per 1 MJ ME for diets below/above this figure.

4. Adjust heifer growth rates for seasonal supply of feed

The growth rates shown in Table 1 are useful for creating an annual plan but they may need adjusting during the year as the availability of feed alters with the season. The assumptions used to calculate intakes were based on:

- Steady growth rate to reach liveweight targets.
  This may be impractical in some circumstances. When a steady growth rate is impractical or uneconomic, the budgeted feeding levels can be adapted so that they match feed availability, while achieving the average growth rate needed over the full grazing term.
  For example, the expected growth rate might be 0.4 kg Lwt/day over winter and 0.8 kg Lwt/day over spring. This will average out to 0.6 kg Lwt/day which will meet liveweight targets.
- Intakes for feeding the mob average.
  In a mob there may be animals that, for a variety of reasons, need preferential feeding. Table 2 outlines the feeding levels required for a range of heifer growth rates at different weights.

**FARMER VIEWPOINT**

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

Dairy farmers, 680 cows, Winton, Southland
Table 2. Daily dry matter intake to achieve different rates of gain, relative to start weight.\(^2\).

<table>
<thead>
<tr>
<th>Start weight (kg)</th>
<th>DM intake for different rates of liveweight gain (kg/cow/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td>100</td>
<td>2.4</td>
</tr>
<tr>
<td>150</td>
<td>3.0</td>
</tr>
<tr>
<td>200</td>
<td>3.7</td>
</tr>
<tr>
<td>250</td>
<td>4.3</td>
</tr>
<tr>
<td>300</td>
<td>4.9</td>
</tr>
<tr>
<td>350</td>
<td>5.5</td>
</tr>
<tr>
<td>400</td>
<td>6.0</td>
</tr>
<tr>
<td>450</td>
<td>7.0</td>
</tr>
<tr>
<td>500</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Notes:
- Intake is feed eaten. Adjust feed offered for expected utilisation, utilisation will be lower in unfavourable weather so feed offered needs to be higher.
- Intake does not include walking/hard hill, add additional 5% for rolling to steep land.
- Intakes do not account for pregnancy, see Table 3 for additional feed required
- Intake assumes feed quality of 11 MJ ME/kg DM. Add/subtract 5% per 1 MJ ME for diets below/above this figure.

Table 3. DM intake requirements (over and above that required for maintenance) for different stages of pregnancy.\(^3\).

<table>
<thead>
<tr>
<th>Weeks before calving</th>
<th>-12</th>
<th>-8</th>
<th>-6</th>
<th>-4</th>
<th>-2</th>
<th>0 (due date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake (kg DM/cow/day)</td>
<td>0.6</td>
<td>1.0</td>
<td>1.4</td>
<td>1.7</td>
<td>2.3</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Notes:
- Calf birth weight assumed to be 30 kg.
- 1705 MJ ME total energy required for pregnancy.
- Assumes feed value of 11 MJ ME/kg DM).

\(^2\)Based on calculations from Ian Brookes, Growing replacement heifers. Massey University, Palmerston North
\(^3\)Based on calculations from Ian Brookes, Growing replacement heifers. Massey University, Palmerston North
Creating seasonal feed plans

The daily heifer intake requirements can be used to create seasonal and annual feed plans (see Table 4). They can then be used to predict feed gaps or adjust stocking rates. The plan should be regularly reviewed and will need to be adjusted if there are unexpected limitations in feed supply or heifers need to ‘catch up’ after a period of low growth.

**Table 4.** Example feed budget linking number of days in a season with feed intakes for growth (feed eaten).

<table>
<thead>
<tr>
<th>Mature liveweight targets</th>
<th>3</th>
<th>4-6</th>
<th>7-9</th>
<th>10-12</th>
<th>13-15</th>
<th>16-18</th>
<th>19-21</th>
<th>22-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily Lwt gain (kg)</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td>0.6</td>
<td>0.6</td>
<td>0.8</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Average daily feed required (kg DM/hd/day)</td>
<td>3.4</td>
<td>3.8</td>
<td>4.1</td>
<td>5.5</td>
<td>6.5</td>
<td>8.6</td>
<td>7.7</td>
<td>10.9</td>
</tr>
<tr>
<td>Estimated days during season feed period</td>
<td>30</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Estimated total feed/hd/feed period</td>
<td>100</td>
<td>340</td>
<td>370</td>
<td>500</td>
<td>590</td>
<td>770</td>
<td>690</td>
<td>980</td>
</tr>
<tr>
<td>Final weight (kg)</td>
<td>100</td>
<td>154</td>
<td>190</td>
<td>244</td>
<td>298</td>
<td>370</td>
<td>406</td>
<td>450</td>
</tr>
</tbody>
</table>

**Notes:**
- In this example the target mature liveweight is 500 kg.
- Growth rates are based on feed information outlined in Table 2.

**More information**
- For more information about feed budgeting see the Feed Budgets page on the DairyNZ website (https://www.dairynz.co.nz/feed/pasture-management/assessing-farm-performance/feed-budgets/).

**FARMER VIEWPOINT**

Know the pasture production for your farm. Our farm doesn’t grow enough feed over the winter to achieve targeted heifer growth so we know we need to budget on a 200 kg bale of silage per heifer. We start feeding silage in May and finish mid-October.

*Contract grazier, 400 heifers, Matawai, Gisborne*

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

*Contract grazier, 1,500 heifers, Mossburn, Otago*