Grazing tall fescue

This technote:
♦ is relevant to dairy farmers wishing to grow summer-active tall fescue in irrigated/high rainfall situations,
♦ presents the findings of recent research into the effect of a range of grazing management treatments on the dry matter production, nutritive value and persistence of summer-active tall fescue pastures,
♦ aims to provide preliminary recommendations for grazing tall fescue that will enable dairy farmers to confidently adopt and manage tall fescue.

Tall fescue (Lolium arundinaceum, syn. Festuca arundinacea) has the potential to become part of the forage system in irrigated dairy farming systems. The advantages of tall fescue relative to perennial ryegrass-based pastures are:
• 40% higher dry matter removal in summer,
• 20% higher dry matter production over a full year,
• comparable nutritive value.
More information on the advantages and disadvantages of tall fescue are given in “Tall fescue for dairy farms”.

Tall fescue therefore appears to be a viable alternative to perennial ryegrass when sowing pastures in irrigated/high rainfall situations. However, several issues including difficulties with grazing management, are limiting the uptake of tall fescue by dairy farmers in these regions.

In the past it was recommended that tall fescue-based pastures were grazed more frequently than perennial ryegrass-based pastures, particularly during spring (Milne et al. 1998), in order to utilise new growth before its rapid decline in nutritive value (Callow et al. 2003). However, the experimental results described in this Technote suggest that there are several advantages, and minimal disadvantages, in grazing tall fescue at longer intervals, using a leaf stage approach.

Many of the issues associated with the grazing management of tall fescue, such as low nutritive value and palatability, are associated with the older cultivars. With the release of new cultivars and a better understanding of its grazing management, tall fescue has the potential to fit into the forage base of dairy farms in southern Australian.

The experiment

The grazing management experiment was conducted near Tatura in northern Victoria on a tall fescue/white clover pasture sown in spring 2010.

For the first 12 months after sowing the site was managed as closely as practical to current establishment guidelines (see “Establishing tall Fescue”). In September 2011, six grazing management treatments were imposed for a 3 year period.

Key results from this research

The 3-leaf grazing management system, in comparison to the Milne et al. (1998) recommendations for grazing tall fescue, had:
• 30% higher DM production removed by grazing,
• higher tall fescue content,
• lower weed content,
• similar metabolisable energy and neutral detergent fibre contents,
• lower crude protein content,
• higher plant persistence, and
• required an extra topping each year.

The 3-leaf and Milne systems are briefly described in the Treatment section on the next page.

Applying this on farm

♦ Grazing at the 2-leaf stage during spring and at the 3-leaf stage throughout the rest of the year appears to be a viable grazing management approach for tall fescue-based pastures.
♦ When grazing tall fescue-based pastures attention needs to be paid to maintaining satisfactory post-grazing pasture masses. This may also require several toppings during spring/summer.
Grazing treatments

The six grazing management treatments imposed in September 2011 were:

- **1-leaf** – grazed at the 1-leaf stage,
- **2-leaf** – grazed at the 2-leaf stage (except during spring when grazed at the 1.5 leaf stage),
- **3-leaf** – grazed at the 3-leaf stage (except during spring when at the 2.0 leaf stage),
- Milne’s **Best-Bet** – grazing based upon the management guidelines of Milne et al. (1998). Grazing intervals were: 60 days in winter, 25 days in August/September, 15 days in October–December, and 21 days in January–April. Grazing residuals were 4–5 cm (except in Oct–Nov when pastures were grazed to 3–4 cm),
- **Lax-Spring** – a variation on Best-Bet. Grazing intervals were: 60 days in winter, 25 days in August/September, and 21 days in October–April.
- **Rye-Freq** – the interval between grazings was set to approximate the rotation length of a well-managed perennial ryegrass-based pasture which was grazed according to leaf stage criteria (see Lawson and Hildebrand 2003). As there were no ryegrass plots within the experiment, the intervals between grazings were similar to those of Lawson and Kelly (2007) and Lawson et al. (2009) in which perennial ryegrass was grazed according to these criteria.

All treatments were grazed to a residual height of 4–5 cm (rising plate meter) unless otherwise specified. The use of a slasher was required to top the plots on several occasions in order to achieve the desired residual height. The annual number of grazings and toppings is presented in Table 1.

**Measurements**

Measurements taken at each grazing for 3 years were:

- Pre- and post-grazing pasture height (used to calculate pasture removed),
- botanical composition,
- nutritive value (metabolisable energy (ME), crude protein (CP) and neutral detergent fibre (NDF) contents), and
- plant frequency, (defined as the percentage of 10 by 10 cm grid cells that contained tall fescue tillers), was used to quantify persistence.

‘Years’ refer to the 12 month periods from September to August.

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**Leaf stage – what is it?**

The leaf stage of tall fescue is the number of fully expanded leaves on a tiller. The first remnant leaf is ignored unless it has grown substantially since the last grazing, in which case it is assessed as a fraction of the length of a fully expanded leaf.

**Why graze based upon leaf stage?**

The advantages of grazing at the ideal leaf stage (i.e. just before the oldest leaves start to die) is that the water soluble carbohydrate content in the tiller bases at the time of grazing is high. This is associated with:

- high nutritive value,
- rapid regrowth, and
- good plant persistence.

Grazing before this point reduces pasture growth, nutritive value and persistence.

Grazing after this point will result in the death of the older leaves, wasted pasture and a reduction in pasture nutritive value.

When growth rates are particularly high, such as during spring, pastures usually need to be grazed before the recommended leaf stage to prevent swards from becoming rank.

Grazing management guidelines based upon a leaf stage approach have been developed for perennial ryegrass and other pasture species including cocksfoot and prairie grass. This suggests that it may be possible to develop grazing guidelines for tall fescue that are based upon leaf stage.

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**Table 1. Number of grazing and toppings for the 6 grazing treatments (averaged over 3 years).**

<table>
<thead>
<tr>
<th>Grazing treatment</th>
<th>Grazed (number of times / year)</th>
<th>Topped (number of times / year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-leaf</td>
<td>15.9</td>
<td>3.0</td>
</tr>
<tr>
<td>2-leaf</td>
<td>10.3</td>
<td>3.3</td>
</tr>
<tr>
<td>3-leaf</td>
<td>8.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Best-Bet</td>
<td>14.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Lax-Spring</td>
<td>12.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Rye-Freq</td>
<td>10.7</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Pasture consumption

- Pasture consumption in all 3 years was highest from the 3-leaf treatment.
- Pasture consumption from the 3-leaf treatment was consistently 30% higher than from the “Best-Bet” grazing system.
- Pasture consumption in both years 1 and 2 from the 3-leaf treatment was not different to that from the 2-leaf treatment, but was higher than that from the other four treatments (Fig 1a and 1b).
- Pasture consumption in Year 3 was higher from the 3-leaf and Rye-Freq treatments than from the other treatments (Fig 1c).

![Pasture removed by grazing or topping from tall fescue swards.](image1)

The tall fescue content of the swards were similar in the first 1.5 years but from late in Year 2 and onwards, it was higher in the 3-leaf than in the 1-leaf treatment (Fig 2a).

There were minimal differences in the white clover content between treatments except for a few months late in Year 2 and early in Year 3 when it was lower in the 3-leaf than in the 1-leaf treatment (Fig 2b).

The weed content of all treatments was generally less than 10% DM except for higher peaks in late summer/early autumn, especially in Years 2 and 3 (Fig 2c). These summer peaks were higher for the more frequently grazed treatments.

The dead content was highest in summer/autumn (usually over 15% DM) and lowest in spring (data not shown).

![Botanical composition of tall fescue swards. Note that the samples were cut to ground level.](image2)

Botanical composition

- There were minimal differences between the treatments in botanical composition during the first 1.5 years.
- During the third year the tall fescue content tended to be higher, and the weed content lower, in the less frequently grazed swards.

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The dead content was highest in summer/autumn (usually over 15% DM) and lowest in spring (data not shown).
**Nutritive value**

- Grazing management had minimal impact on the metabolisable energy and neutral detergent fibre contents of the pasture on offer.
- Crude protein contents were up to 3% DM lower in the less frequently grazed swards.

Crude protein content ranged between 10 and 20% DM and was higher in winter/spring than in summer. Crude protein was often lower in the less frequently than in the more frequently grazed treatments (Table 2).

Estimated metabolisable energy (ME) contents were usually higher in winter/spring (around 11 MJ/kg DM) than in mid-summer/autumn (around 10 MJ/kg DM). The grazing treatments had minimal impact upon the ME content of the swards (Table 2).

The neutral detergent fibre (NDF) content ranged from 40-55% DM and tended to be lower in spring than in summer/autumn. The grazing treatments had minimal impact upon the NDF content of the swards (Table 2).

**Table 2.** Crude protein (CP), metabolisable energy (ME) and neutral detergent fibre (NDF) contents of tall fescue swards on average over 3 years. The samples were cut to ground level.

<table>
<thead>
<tr>
<th>Grazing treatment</th>
<th>CP (% DM)</th>
<th>ME (MJ/kg DM)</th>
<th>NDF (% DM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-leaf</td>
<td>17.3</td>
<td>10.3</td>
<td>48</td>
</tr>
<tr>
<td>2-leaf</td>
<td>15.3</td>
<td>10.3</td>
<td>49</td>
</tr>
<tr>
<td>3-leaf</td>
<td>14.0</td>
<td>10.3</td>
<td>49</td>
</tr>
<tr>
<td>Best-bet</td>
<td>15.9</td>
<td>10.2</td>
<td>50</td>
</tr>
<tr>
<td>Lax-Spring</td>
<td>15.1</td>
<td>10.2</td>
<td>50</td>
</tr>
<tr>
<td>Rye-Freq</td>
<td>14.5</td>
<td>10.3</td>
<td>49</td>
</tr>
<tr>
<td>l.s.d. (P=0.05)</td>
<td>0.6</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

The persistence of the tall fescue, as measured using plant frequency, was not impacted by grazing treatments throughout the first year of the experiment (Fig 3). However, by the summer of the third year, plant persistence was higher in the less frequently than in more frequently grazed treatments.

**Plant persistence**

- Tall fescue persisted better with less frequent grazings.

The results of this experiment indicate little difference between grazing management systems in the ME and NDF contents, while the CP content was lowest in the 3-leaf system.

The major negative of using the 3-leaf regime was that the grazing herd had some difficulty at times in fully utilizing the pasture. This means that when grazing tall fescue-based pastures, attention needs to be paid to maintaining satisfactory post-grazing pasture masses. Achieving this may require an extra topping each year.

**Using tall fescue on dairy farms**

A grazing regime for tall fescue based upon the 3-leaf stage appears to be promising as it was the most productive of the grazing management treatments in each of the three years of the experiment, with pasture consumption 30% higher (14.5 vs. 10.9 t DM/ha) than that from the “Best-Bet” system. Note that this work was done on small plots and still needs to be tested at the whole farm level.

When comparing grazing management systems on farms a range of factors need to be considered in addition to pasture consumption. These factors include nutritive value, plant persistence and the ability of lactating dairy herds to efficiently utilize the DM grown.

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Further Reading

Establishing tall fescue (*in press*) (Department of Economic Development, Jobs, Transport and Resources, Tatura.)


Tall Fescue - 3030 (Dairy Australia)

Tall fescue for dairy farms (*in press*) (Department of Economic Development, Jobs, Transport and Resources, Tatura.)

References


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