

Managing Pasture Prior To Seedhead Development

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A Farm Advice Sheet from **SowtheSeed**

The majority of pastoral farmers rely on feeding their ruminant stock ryegrass pastures.

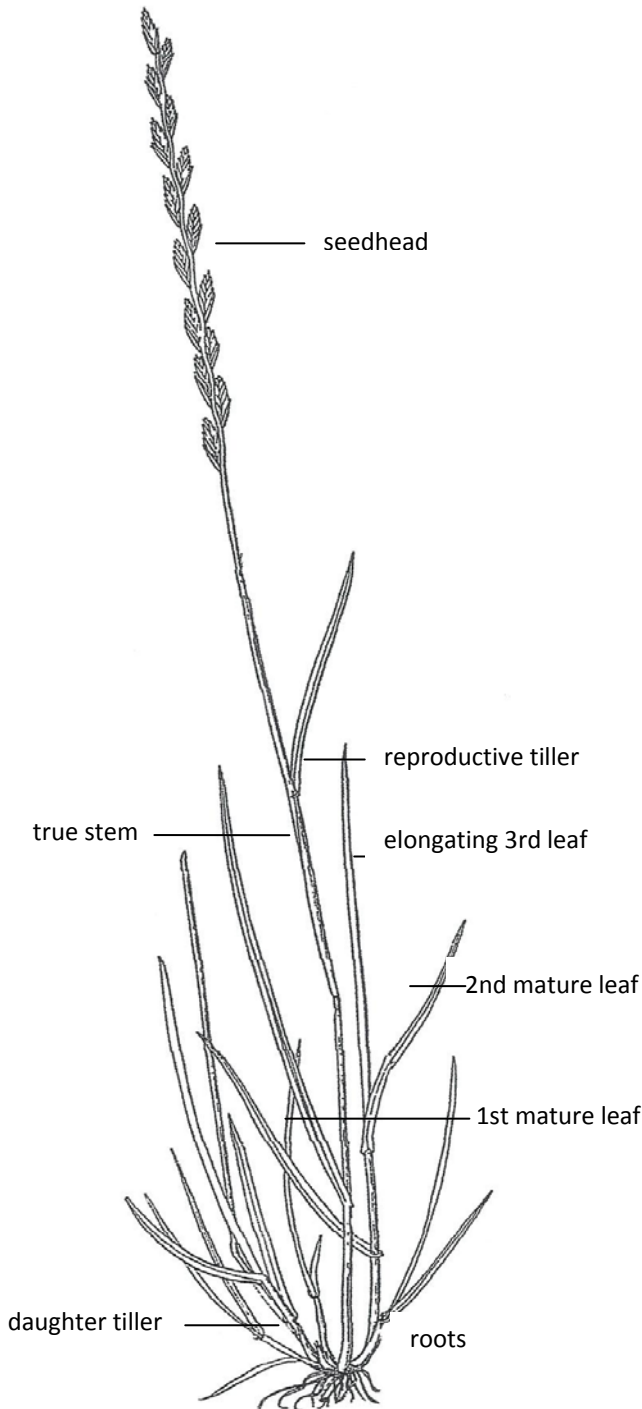
Ryegrass is a great feed:

- Under a temperate climate it can grow 365 days of the year providing it has adequate moisture, fertility and temperature.
- When it is at its most nutritious it has - high energy levels
 - good protein levels
 - good fibre levels
 - adequate mineral levels
 - good palatability.

However, the problem with ryegrass is that it is not consistent in quality and growth throughout the year. One such time is from October onwards as the grass starts going to seed. At this time the ryegrass undergoes physiological changes which have a negative effect on animal performance, particularly in the dairy cow, increasing the rate of decline in milk production after their peak. Milk production can drop by up to 12% in a month at this time while in controlled diets you should see no more than 5% drop in a month.

So what is happening to pasture at this stage of the year?

The ryegrass plant is essentially a number of individual tillers. Normally these tillers are vegetative, but as daylight hours lengthen and temperatures increase some of these tillers start to become reproductive. The first sign that a tiller is becoming reproductive is the sequential development of up to 5 nodes along the true stem. The uppermost node is the growing point. When the plant is in the vegetative state, this growing point is at ground level. It moves up as the tiller starts to set seed. This reproductive tiller has a lot more fibre (lignin) in it and is lower in energy and protein.



The differences in quality at various times of the year can be seen in the following table.

Table 1: Pasture Comparison

	Dry Matter %	ME MJ/KG DM	Crude Protein %	NDF %	Ca %	Mg %
Leafy Spring Pasture	14	11.8	25	45	0.60	0.15
Leafy Summer Pasture	20	10.0	20	50	0.85	0.20
Summer Pasture (Dry and Stalky)	25	8.0	12	58	0.70	0.20

The summer pasture is at a stage where the quality has declined because of lower soluble energy, lower protein levels and higher fibre content. This means that the cow doesn't get as much energy per kilogram eaten, and can't eat as much because the higher fibre levels reduce passage time in the rumen.

What can we do to minimise reproductive tillering?

Grazing Management

By grazing pastures at the 2.5-3 leaf stage you will have been maximising the ryegrass's potential for growth. However once the grass stem starts to elongate you should try and graze the pasture at the 2 leaf stage to help put more pressure on the plant and avoid losing quality. Round length needs to be sped up, but giving the cows a bigger area isn't an option as you will leave more rank feed behind. Residuals of 15 – 1600kgDM should be the aim. Dropping pastures out for crops and grass silage are the preferred options if residuals start to lift above this. Grass silage in particular helps to control pastures over a time when growth rates normally exceed cow requirements for low to average stocked farms. Regrowth in grass silage paddocks will also help you to lengthen the round again when the majority of seedheading has passed, enabling a return to grazing at 2.5 leaf appearance intervals.

How do you determine how much of the farm to drop out for silage?

As an example a 100 ha farm with 3 cows per hectare requires growth rates of 60kgDM/ha offered to fully feed the cows. If growth rates lift to 80kgDM/ha/day, and look to be staying above this level, then you could potentially drop 25% of the farm out of the round. Monitoring pasture growth rates by doing regular farm walks will need to be done to ensure that areas dropped out don't force cows to be underfed.

Topping of pastures

The reproductive tiller will die if it is cut (or grazed) below the growing point. This will initiate new tillers, of which the majority will be vegetative. The

question of whether to top before or after grazing has been raised with inconclusive results.

- Topping before grazing is less messy, and best if pasture quality hasn't deteriorated significantly. If you strategically top parts of paddocks the cows will eat what has been topped
- However, with stalky pasture later in the season when the grass has more lignin, it could be better to top after grazing. Topping to waste could provide leaf litter for facial eczema spores.

Chemical topping with light rates of glyphosate can be used to suppress seedhead development and help maintain vegetative growth. It also has the effect of encouraging clover growth. This practice is more often suited to hill country pastures where there are low quality grass species, and is less likely to suit more fertile ryegrass pastures.

Nitrogen

Applying nitrogen at moderate levels can also help maintain leafy pastures. The nitrogen helps to reduce the stress on the ryegrass plants.

Stocking rate

Generally the lower the stocking rate the harder it is to control the pasture because growth rates exceed the amount the cows can eat. Topping, dropping paddocks for silage and hay, or for crops will also help.

Having a high stocking rate can help because cow requirements are seldom met by grass alone, so supplementation is needed to fully feed the cow. This is positive in that the amount of lower quality grass fed is diluted, and as long as the supplement fed is as good and preferably better than the grass, milk production will hold better. The risk is feeding too much supplement, and leaving more grass behind. This can result in a spiral of poorer quality grass for the next round.

Ryegrass Species

Perennial Ryegrass (*Lolium perenne*) comes in a large number of varieties with different characteristics and types. Key considerations when choosing ryegrass species are heading date, endophytes and ploidy effect.

1 Heading Dates

Ryegrass varieties are often classified by their heading date. As the ryegrasses begin their reproductive phase in spring there is an associated boost in drymatter production for about six weeks preceding seedhead emergence. As seedheads start to develop, the ryegrass also begins to lose feed quality, associated with the reproductive stems, which become increasingly fibrous as they mature.

Heading dates are given relative to Nui, which is defined as Day Zero, typically the 22nd October. (See Table 2.) This can vary from year to year due to daylight length and temperature. It is preferable not to sow different ryegrass species in the same paddock if they have different heading dates. If we know when the variety is likely to

go to seed, we may be able to manage the variety better to avoid as many seedheads being produced. Planting mid season ryegrass in some paddocks, and late seeding in other paddocks gives options on dropping paddocks out for silage, rather than trying to force cows to control ryegrass varieties going to seed.

Aftermath heading occurs when the grass plant continues to produce further seedheads after the main flush of seedhead production has taken place in spring. Seed companies are now selecting cultivars that are low in aftermath heading. This reduces the time that the plant is reproductive, and means the plant starts producing high quality vegetative leaves sooner.

Table 2: Heading dates of a range of perennial ryegrass

Cultivar	Ploidy	Type	Heading Classification	Heading Date
Meridian	Diploid	Perennial	Early	- 17
Bronsyn	Diploid	Perennial	Mid Season	0
Nui	Diploid	Perennial	Mid Season	0
Commando	Diploid	Perennial	Mid Season	+ 1
Extreme	Diploid	Perennial	Mid Season	+ 3
Revolution	Diploid	Perennial	Late	+ 18
Banquet 11	Tetraploid	Long Rotation	Late	+ 18
Bealey	Tetraploid	Perennial	Very late	+ 25

2 Endophytes

Endophytes are naturally occurring viruses found in many grasses including ryegrass, and assist with plant survival. They provide the plant with protection from various insects and other plant pests, enhancing the yield and persistence of the grass. In return the plant provides endophytes a place to live and reproduce. However they are in higher concentrations when the plant is becoming reproductive and this can also cause stock health problems such as ryegrass staggers and heat stress, resulting in lower milk production.

The main endophyte compounds found in ryegrass are:

- Peramine- a natural insecticide that controls some important insect pests; is non toxic to stock.
- Lolitrem B- may provide some insect protection; causes summer ryegrass staggers.
- Ergovaline- a compound that in moderate to high amounts could reduce animal performance due to heat stress, but provides protection against some important pests.
- Epoxy-janthitrems- a unique alkaloid thought to have a role in protection against insects. Epoxy-janthitrems may cause ryegrass staggers.

Endophytes can only be transmitted from one plant to another by seed. New endophyte strains can be introduced into different ryegrass cultivars, but there is no transmission between adult plants growing in pasture.

Because of the detrimental effects on cow health shown by some endophytes, seed companies have developed novel endophytes that control insects without affecting animal health as much. By choosing varieties with “animal friendly” endophytes, you will also help minimise milk production decline and poor animal health. The main endophytes used by seed companies at present are AR1, AR37, Endo5, NEA2 and standard endophyte as well as no endophyte. Briefly, the endophytes used by plant breeders try to balance what is best for the plant and for the animal. If the grass becomes too palatable the insects and cows will reduce the persistence of the grass by overgrazing. However, if it is not palatable to the cow, there is little point growing it.

When planting new ryegrass the seed should be treated to protect the seedling from insects as the endophyte levels initially are very low. Until recently AR 1 has performed very well, but recent droughts and issues with black beetle has reduced persistence on many farms north of Taupo.

Table 3: Endophyte compounds in various Endophyte types

Endophyte Type	Peramine	Lolitre B	Ergovaline	Epoxy-Janthitrems
AR 37	No	No	No	Yes
AR 1	Yes	No	No	No
Endo 5	Yes	No	Low	No
NEA2	Yes	Low	Low	No
Standard	Yes	Yes	Yes	No
Without	No	No	No	No

3 Ploidy and ryegrass plants

Ploidy is the number of complete sets of chromosomes in a biological cell. Perennial ryegrass plants are generally **diploid** - that is they have two sets of chromosomes, whereas **tetraploid** plants have four sets of chromosomes. The effect is that tetraploid plant cells are bigger than diploid plant cells, with a higher ratio of cell contents to cell wall. This makes the plant more palatable to animals, resulting in improved energy intake and increased production. However, increased palatability means that overgrazing needs to be minimised or plant persistence could become an issue.

Summary

The key to minimising the decline in the dairy cow's milk production post peak is to maintain pasture quality at a time when the ryegrass plant is trying to go to seed. Maintaining quality reduces the number of seedheads emerging. Look at the leaf emergence rates and speed the round up by going to the 2 leaf stage rather than the 2.5 leaf stage. Using pasture management practices such as dropping paddocks out of the grazing rotation for silage and crops, as well as topping, effectively increases the grazing pressure on the remaining pastures so that residuals are not allowed to go too rank.

For a more long term approach, selecting different ryegrass cultivars can improve the quality of the pasture over this time. Choosing the right endophyte type for your area, whether you use tetraploid versus diploid, early, medium or late heading date and the amount of aftermath heading can all help improve the quality of grass being eaten.

If you have any further questions please contact your Intelact consultant or call Intelact Head Office on 0800 735 588.