TechNote 22

Manage summer pastures correctly

IN THIS TECHNOTE

The principles of pasture management and the key performance indicators during the mid-lactation, summer months are similar with other times of the year.

For more details see TechNotes 9: Pasture management and 17: Allocate spring pasture correctly.

22.1 Understand summer-dry pastures

The primary difference between summer and spring pastures are that in summer-dry, non-irrigated regions, leaf emergence rate and thus pasture growth rates are slower (due to reduced moisture and/or high soil temperatures). Therefore, slowing down the round, or increasing the number of days in the rotation, to capture the 3rd leaf, will help achieve maximum growth during summer and increase feed available during the autumn months.

In summer-dry, non-irrigated regions, the high air temperatures and moisture stress can cause a build-up of dead material (stem and stalk) in the base of the pasture. This results in an increase in DM % (kg DM for a given height) and fibre (NDF and ADF) content of the pastures, as well as a corresponding decrease in pasture quality (MJ ME/kg DM; Table 1). The greater DM% and lower quality (ME) need to be considered when allocating daily pasture allowances.

For example: A mid-lactation Kiwi Cross cow weighing 500 kg LWT, producing 1.4 kg MS, and walking 2 km over rolling terrain, requires approximately 177 MJ ME/day.

This equates to:

17 kg DM/cow/day - Dry summer pasture in the Waikato with ME = 10.5 MJ

14 kg DM/cow/day - Irrigated pasture in the South Island with ME = 12.0 MJ

Table 1. Typical pasture composition during summer in different regions.

	Northland - Kikuyu		North Island/dryland Southland		Irrigated South Island	Wetlands
	Leafy	Stemmy	Leafy	Dry stalky	Leafy	Leafy
DM%	20 - 30	40 - 60	15 - 20	20 - 30	13 - 20	13 - 22
MJ ME/kg DM	9.0 – 11.0	7.0 - 9.0	10.5 – 11.5	9.0 – 11.0	11.0 – 12.5	10.0 – 12.5

Pasture quality during this time depends on environmental factors such as moisture and temperature; however, there is also a big impact of prior pasture management (Figure 1). If target post-grazing residuals are not met during the spring months, the quality of pasture available during summer months declines (Table 2).

Figure 1. Impact of good and poor spring pasture management on performance in summer.

Good spring management (residuals 7- 8 clicks)

Increased ME, growth rate, and milksolids production in summer

Poor spring management (residuals more than 8 clicks)

Increased dead material

Decreased ME, growth rate, and milksolids production in summer

Two farmlet trials (in Waikato and Taranaki) fed additional palm kernel extract (PKE) to cows during spring and left behind higher than recommended post-grazing residuals (approximately 1900 kg DM/ha). These were compared with farmlets that fed no PKE and grazed to target residuals (1500 – 1600 kg DM/ha) in spring.

When measured in summer, pastures from the high residual farmlet had increased fibre (NDF) content and reduced quality (ME, and CP content) compared with pastures previously grazed to target residuals (Table 2).

Table 2. Summer pasture in Waikato (Jan – Mar) following different pasture management during spring (Aug – Dec).

	Prior post-grazing residuals from August to December	
	Target residuals	High residuals
Pasture Quality (MJ ME/kg DM)	11	10
Crude protein (% DM)	18	15
NDF (% DM)	51	56

These results highlighted the importance of spring pasture management on whole season performance. Lower pasture quality and a build-up of hard stem and dead material act as a barrier to grazing, reducing cow bite size, bite rate and consequently energy intake. This was evident, as although cows that were supplemented with PKE and grazed to high residuals in spring, had greater milksolids production during this period; their summer production, and profitability of the whole season was less (Table 3).

Table 3. Cow performance and costings for farmlets following different pasture management during spring (Macdonald, 2016).

Milksolids (kg/cow)	Prior post-grazing residuals from August to December	
	Target residuals	High residuals
Milksolids: Aug - Dec (kg MS/cow)	188	199
Milksolids: Jan - Mar (kg MS/cow)	91	87
Milksolids: Aug - Mar (kg MS/cow)	279	286
Costs less return for high vs. target farmlet ($/cow)		-$30

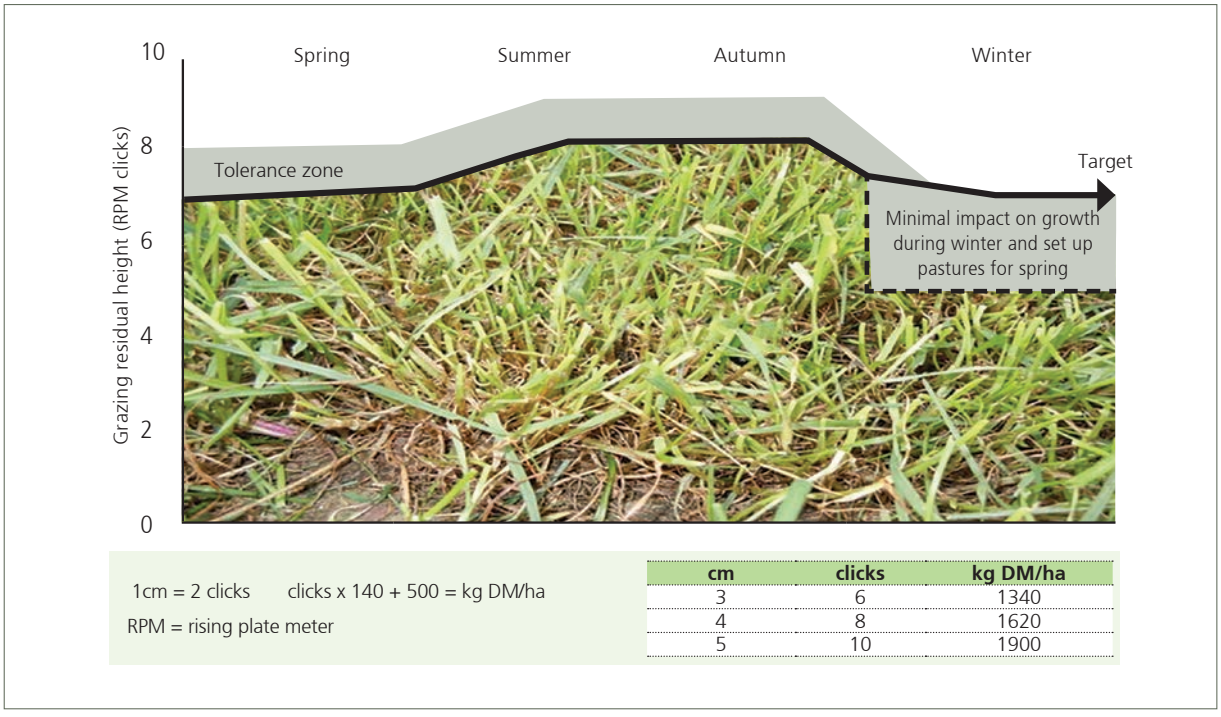
In irrigated areas, summer pastures are generally consistent with spring pastures (Table 1) and should be managed according to spring pasture management principles, keeping in mind targets for the remainder of the season (e.g. average pasture cover at dry off).

For more details see TechNotes 9: Pasture management and 17: Allocate spring pasture correctly.

22.2 Avoid under- or over-grazing summer pastures

In summer-dry pastures, the build-up of stem and dry matter means there is a slight increase in the post-grazing residuals (8 -9 clicks RPM, 4 – 4.5 cm) during this period compared with spring or winter (Figure 1).

Figure 2. Schematic representation of target post-grazing residulas (compressed height) throughout the season (McCarthey et al., 2015).



cm	clicks	kg DM/ha
3	6	1340
4	8	1620
5	10	1900

However, it is still important to maintain residuals in this range and not over- or under-graze pastures (Figure 3).

Figure 3. Impact of different grazing residuals during summer.

Over-grazing (< 4 cm)	Target (4 – 4.5 cm)	Under-grazing (> 4.5 cm)
Decreased energy stores	Long term pasture quality and persistence	Increased evapotranspiration
Lag in regrowth after rain		Increased dead material
Plant death		Decreased quality in next round
Increased weeds		
Can increase risk of facial eczema if spore counts are high		Can increase risk of facial eczema if dead material builds up in base of pasture

Over-grazing

Over-grazing pastures in summer (residuals less than 4 cm compressed height) depletes the energy stores of the plant that are primarily contained in the bottom 4 cm of the plant. This results in a lag in the pasture regrowth stage when moisture does become available (e.g. after the autumn rains).

Severe or repeated over-grazing during this period can result in plant death, which increases weeds and will have negative consequences for longer term pasture persistence. If there are high facial eczema (FE) spores in the pastures, over-grazing can increase the intake of spores and increase the risk of FE. See TechNote 24 for more information on FE.

Under-grazing

Under-grazing pastures reduces quality for the remainder of the season and leaves energy (pasture) behind in the paddock. It is important that post-grazing residuals are no greater than 4.5 cm during this period. If higher residuals are left in summer, pasture quality declines and dead material left at the base of the pasture may rot when it rains.

Leaving behind higher than recommended residuals during summer, can increase moisture stress on the pasture

Contrary to some beliefs, there is no benefit to the plant in terms of shading from leaving high post-grazing residuals in summer. In fact, high post-grazing residuals can increase moisture stress through increased transpiration and evaporation. Residuals of 4 – 4.5 cm will ensure that the plant maintains its energy reserves and provides shading of the soil surface.

Additionally, in areas that are prone to FE, leaving high residuals and increasing the amount of dead litter in the base of the sward, particularly during December months, increases the risk of high spore counts and FE.

22.3 Monitor and mitigate facial eczema (FE)

Facial eczema (FE) is a disease that causes damage to the liver and photosensitisation (Figure 4). It is caused by a toxin (sporidesmin) produced by the spores of the fungus "*Pithomyces chartarum*" growing on the pasture. The fungus grows in the dead litter at the base of pasture in warm, moist conditions, generally during December to May. When cows eat the spores, the sporidesmin damages the liver and bile ducts. The damaged liver cannot rid the body of wastes and toxins. A breakdown product of chlorophyll builds up in the blood causing sensitivity to sunlight, which in turn causes inflammation of the skin, in particular on the face, udder and areas of unpigmented skin.

Q: What are the signs of facial eczema?

A: Cows are restless, seeking shade and licking their udder. Exposed unpigmented or thin skin reddens, thickens and peels. There will be a drop in production and in severe cases, death can occur.

Figure 4. *Steps outlining how facial eczema occurs.*

There is no cure for FE so prevention is very important. This involves both animal and feed management strategies:

Feed management strategies

- Achieve target post-graze residuals prior and during risk periods:
  - Topping or high residuals left in December/January can increase the build-up of soft litter at the base of the pasture increasing fungus and spore development.
  - The fungus grows on the soft litter, so over grazing during danger periods when spore counts are high can increase the risk of spore intake.
- Spraying the pasture with a fungicide will slow the development of the fungus and subsequent production of spores if applied while pasture is green and growing, and spore counts are below 20,000.
- Monitor spore counts on your own farm, as there can be a wide range within regions.

Animal management strategies

- Monitor spore count and ensure animals are treated effectively with zinc to prevent FE. Consult your veterinarian or see DairyNZ website dairynz.co.nz/animal/cow-health/facial-eczema for more details on dosing rates and management.
- Breeding animals that are more tolerant to FE can help reduce the risk and impact from facial eczema in the long term.
- Every farm should have an appropriate treatment plan, and all the farm team should be equipped with the necessary skills and resources to detect and treat FE efficiently and effectively. Consult your veterinarian or see DairyNZ website www. dairynz.co.nz/animal/cow-health/facial-eczema for more details on treatment.

22.4 Further reading

Boyd, E. 2016. Management of Facial Eczema. Thesis of Master of veterinary studies in epidemiology. Massy Research Online: https://mro.massey.ac.nz/bitstream/handle/10179/8319/02_whole.pdf

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DairyNZ Facial Eczema. Management for NZ dairy herds. www.dairynz.co.nz/media/1653952/facial-eczema-management-guide.pdf

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Roche, J. R., L. R. Turner, J.M. Lee, D. C. Edmeades, D. J. Donaghy, K.A. Macdonald, J. W. Penno, and D. P. Berry. 2009. Weather, herbage quality and milk production in pastoral systems. 2. Temporal patterns and intrarelationships in herbage quality and mineral concentration parameters. Animal Production Science. 49: 200 – 210.