Management of pasture quality for sheep on New Zealand hill country

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Introduction The control of pasture quality over spring is central to the achievement of high levels of sheep performance on hill country. Despite this, with the exception of the work of Lambert *et al*. (2000), little is known about how farmers actually manage pasture quality. The purpose of this research was to describe how a high performing hill country farmer manages pasture quality on their sheep area over spring and from this develop a framework that will assist other farmers improve their pasture management.

Method and materials The case study farmer (647 ha, 7,770 s.u.) was selected because of his high levels of performance for the district and expertise in tactical feed management. Data collection was primarily through monthly semi-structured interviews supported by field observations. Interview data were transcribed verbatim and analysed using qualitative techniques to develop a model of the farmer's decision-making processes.

Results and discussion The control of sheep pasture quality requires farmers to make important strategic and tactical decisions (Figure 1). Strategic decisions aim to match feed supply with pasture growth over the spring and maintains grazing pressure so that average pasture cover (APC) levels do not exceed 1200 kg DM/ha. Key decisions in this area include lambing date, stocking rate, sheep performance levels, pasture cover at set-stocking, stock purchase and sale dates, shearing policy and weaning date. Equally important are the tactical decisions to minimise within- and between-block variation in pasture cover levels (≈ 1200 kg DM/ha) during mid- to late-spring. Key tactical decision areas include: (1) ensuring the correct distribution of pasture cover at set-stocking, (2) setting stocking rate and pasture cover levels at set-stocking for the different sheep mobs that best match feed demand to pasture growth, (3) integrating cattle to help control the steeper contour sheep paddocks and (4) using fortnightly monitoring and micro-budgeting to match feed demand with feed supply.

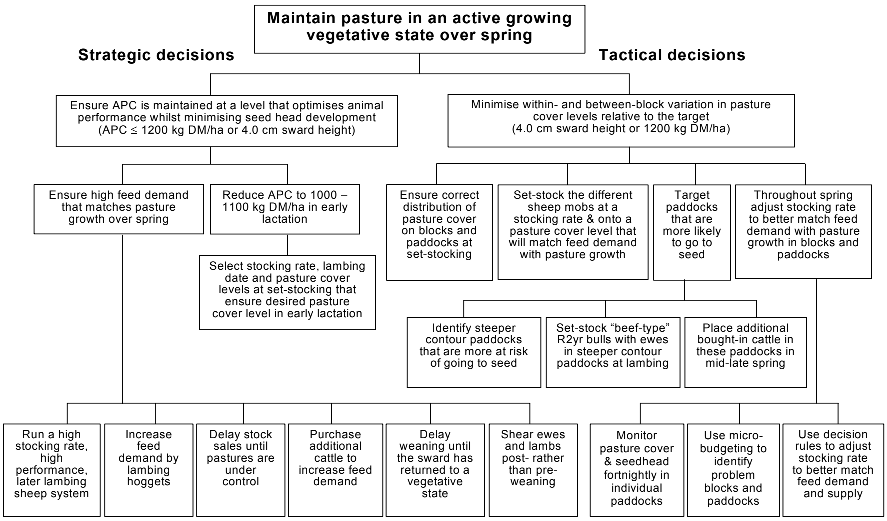

Figure 1 Methods used by the case farmer to manage pasture quality on his sheep area

Conclusions This study highlights that the control of pasture quality on hill country is complex, requiring farmers to make a range of important strategic and tactical decisions. The model presented in this paper provides a framework that other farmers can use to improve their management of pasture quality on hill country.

References

Lambert, M.G., M.S. Paine, G.W. Sheath, R.W. Webby, A.J. Litherland T.J. Fraser, & D.R. Stevens (2000). How do sheep and beef farmers manage pasture quality. In: *Proceedings of the New Zealand Grassland Association*, 62, 117 - 121.

Survey of tetraploid and diploid perennial pastures in the Waikato for number of spores produced by the fungus *Pithomyces chartarum*

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Keywords: diploid, facial eczema, perennial ryegrass, *Pithomyces chartarum*, tetraploid

Introduction Facial eczema (FE) is a disease of livestock, caused by a toxin released into the bloodstream after digestion of spores of *Pithomyces chartarum,* a fungus residing in necrotic plant material in the base of pastures (di Menna & Bailey, 1973). Spore numbers tend to be highest in warm, humid conditions, where high post grazing residuals have lead to a build up of necrotic plant material. Tetraploid perennial ryegrass pastures tend to be more palatable, and with lower post gazing residuals, than equivalent diploid pastures; thus we hypothesised that spore numbers would be lower in tetraploid pastures. A survey of tetraploid and diploid pastures was carried out to investigate the relationship between FE spore numbers, and perennial ryegrass ploidy levels.

Material and methods Fifty pairs of diploid and tetraploid perennial ryegrass based pastures from 37 farms in the greater Waikato area were sampled for FE spores during March, April and May 2004. Eight cultivars were represented in the diploid pastures, while cv. Quartet (4 weeks later flowering than most of the diploid pastures) was the sole ryegrass in 84% of the tetraploid pastures, with 16% based on cv. Banquet. Both paddock and farm information was collected for sowing date, sown cultivars, soil type (silt/ash, sandy loam, clay, peat), soil fertility status (Olsen-P either <20 or $\geq$ 20) and stocking rate. Before each assessment, pasture cover (measured using a capacitance probe) and days since last grazing were recorded, and a grass sample was collected. FE spore numbers were assessed in a sub-sample (20-25 g) while a second (100 g) sub-sample was oven dried for 24 hours at 80°C to determine dry matter (DM) percentage. Data analyses used the Generalised Linear Mixed Model procedure of Genstat 7. Back transformed means are presented in this paper.

Results Average spore numbers in 2004 were below the long-term average, but higher spore counts were observed each month in diploid perennial ryegrass pastures relative to tetraploid pastures (Table 1). The largest difference was in April (P<0.05). Similarly pastures sown on clay soils contained consistently more FE spores than pastures on the other three soil types, the difference being significant compared to the other three soil types in March, but only compared to ash/silt soil in April (P<0.05). In April, pastures on peat soils contained more (P<0.05) spores than those on ash/silt soil. Spore counts were higher when Olsen-P levels were lower (<20) than with higher levels (>20), the difference was significant in March (P<0.05). No other factor had a significant effect on spore counts at any time. Farms and paddocks had some (NS) effect on FE spore counts that may have been due to varying weather conditions, and/or differences in farm management strategies.

Table 1 *Pithomyces chartarum* spore numbers over three consecutive months on pastures with different ploidy levels, soil types and soil fertility status (spores/g DM pasture)

Ploidy	March	April	May	Total
Diploid[1]	127,000	105,000	64,000	339,000
Tetraploid[1]	99,000	66,000	38,000	240,000
LSR (5%)[2]	1.62	1.6	1.9	1.5
Soil type				
Ash/Silt	78,000	44,000	45,000	189,000
(Sandy) Loam	107,000	75,000	40,000	272,000
Clay	326,000	121,000	66,000	511,000
Peat	59,000	119,000	51,000	250,000
LSR (5%)	2.6	2.2	3.9	2.1
OlsenP status				
Olsen-P <20	245,000	127,000	101,000	508,000
Olsen-P $\geq$20	51,000	54,000	24,000	160,000
LSR (5%)	3.5	2.8	5.2	2.4

[1] Diploid, 8 cv's; Tetraploids Quartet (84%), Banquet (16%)
[2] LSR (5%) stands for least significant ratio

Conclusions Pastures that mostly consisted of the late flowering cv. Quartet showed lower spore numbers relative to diploid pastures. Further work is required to confirm whether this is a ploidy effect and not flowering date or some other cultivar factor. The survey also indicates that spore numbers are likely to be higher when Olsen-P levels are low (<20) and on clay soils. Higher spore numbers on clay soils could be a consequence of high moisture retention capacity, or differences in pasture growth rate and grazing pressure.

References

Di Menna, M.E. & J. R. Bailey (1973). *Pithomyces chartarum* spore counts in pasture. *New Zealand Journal of Agricultural Research,* 16, 343-351.