Back to the future – making pasture work for you this spring

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Summary statement: You can manage cows through winter and spring without purchased feeds by ensuring stocking rate, pasture cover and crop yields, and cow body condition score are correct at the start of calving, and the Spring Rotation Planner dictates area of the farm allocated/day.

Breakout summary box

<u>Key lessons learned from the New Zealand Grazing Research</u>

1. Your stocking rate and how you manage your pasture and crops through autumn and winter will dictate whether you will need purchased supplements this winter and spring
2. Autumn management must be focussed on achieving pasture cover targets before calving
    - Higher pasture covers at the start of winter result in greater winter and early-spring growth rates, and greater cow intakes and milk production
    - The amount of feed on the farm in July and August is strongly linked to the amount of milk produced from pasture before Christmas
3. The **Spring Rotation Planner** is the most important 'tool in the shed' for managing cows through spring. Properly used, the Spring Rotation Planner
    - minimises the duration of any feed deficit in early lactation
    - ensures that cows are well-fed and on a rising plane of nutrition before mating
4. Shortening the grazing rotation during a winter/early spring feed deficit to increase cow dry matter intake will increase the length and severity of the feed deficit, increase the requirement for purchased feed, and increase cost of production.
5. These recommendations are true, irrespective of whether cows are wintered at home on pasture or wintered off farm on crop.

New Zealand's grazing system – *"the eighth wonder of the world"*

In the 1970s and 1980s, Dr. Arnold Bryant and the team at Ruakura undertook grazing experiments that were to revolutionise the way pasture was managed through winter and

spring[1,2,3]. In fact, their advice became the template for how grazing cows were to be managed internationally. The system matched herd demand, through assigning the correct calving date and stocking rate, with a store of pasture (i.e., cover at calving) and crop and an assumed winter growth rate. Discipline in following recommended winter-spring rotation lengths meant that pasture growth and quality were maximised, cows were well fed and on a 'rising plane of nutrition' going into mating, and any feed deficits, due to colder or wetter than normal winter conditions, were small and short lived.

Considering the need to minimise expenditure this year, it is important to revisit this work and understand its applicability for farming today.

The four pillars of successful grazing

Bryant and his co-workers identified four important system-level factors to optimise winter-spring grazing management; two were strategic and two were operational.

Strategic management factors

1. Calving date
2. Stocking rate

Tactical management factors

3. Autumn pasture management and the ideal cover at calving
4. Area allocated/day during winter and the development of the spring rotation planner

Strategic management decisions around stocking rate and calving date have already been decided for this season; but, they should be re-considered in spring to determine if they are optimum for future years. At this point in time, however, we can still optimise farm management through winter and spring and minimise our reliance on purchased feeds by focusing on pasture management.

1. Autumn pasture management and the ideal cover at calving

Summary statement: *pasture cover in July and August are strongly associated with milk production/ha before Christmas.*

In the 1984 Ruakura Farmers' Conference proceedings, Arnold Bryant reported that the objectives for autumn pasture management are to:

1. Provide sufficient high quality feed for early lactating cows
2. Ensure cows are at target body condition at calving

and that these dual aims should be achieved with minimum pasture damage.

Pasture cover between July and September was directly related to pre-Christmas milk production[4], because higher pasture covers in August resulted in higher growth rates during winter[5] and in early lactation cows being better fed. Adapting the recommendations of Bryant and co-workers, the optimum pasture cover at calving is 2,300-2,400 kg DM/ha, although lower covers may be optimal where dry cows are off-wintered and/or winter growth rates are more than 25 kg/ha/day.

To establish optimum pasture cover in July-August,

a. rotation length needs to be extended from 40 days in April to 90 days a month before calving, where herds were wintered on-farm, or
b. the majority of cows have to be removed from the farm for 60-75 days, if off-wintering.

In the Ruakura research, a rotation of 80-120 days between April/May and July resulted in 10-15% more milk before Christmas when compared with a rotation length of less than 50 days. This is because growth rate during winter increased with average pasture cover (Figure 1): for every 100 kg DM increase in pasture cover, growth rate increased 7 kg DM/day, providing the daily requirements of a dry cow or more than half the requirements of a milking cow during the first month in milk.

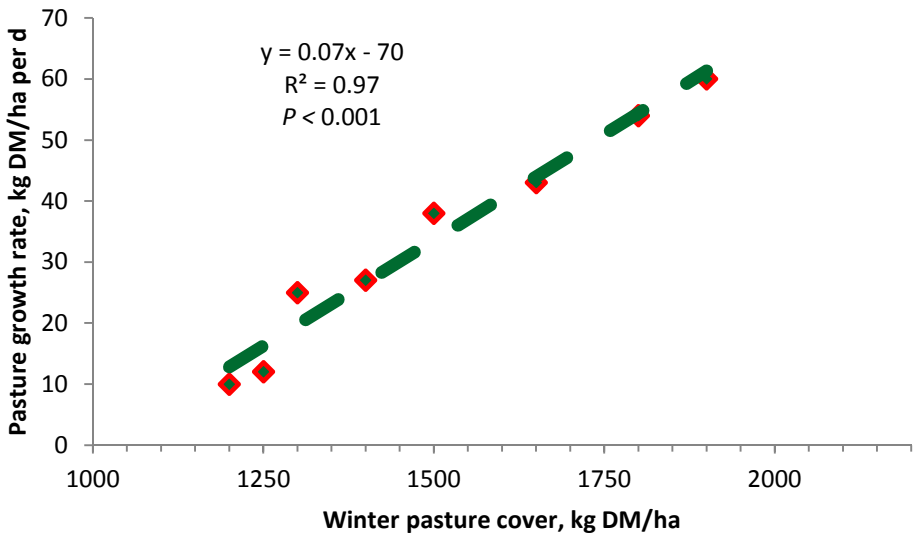

Figure 1. *Relationship between pasture cover during winter and average pasture growth rate in the Waikato. For every extra 100 kg DM/ha pasture cover, pasture growth rates increased 7 kg DM/ha per day.*

The increase in pasture cover at calving is a result of lengthening the rotation in the autumn and this is achieved by allocating a set amount of area/day for grazing using the ***Autumn Planner*** (Figure 2). The area has to feed all stock on the farm; therefore, the farmer needs to adjust the number of cows milking and dry to ensure a) dry cows are adequately fed to gain body condition and b) milking cows receive enough feed for maintenance and milk production.

As the area allocated/day declines each day, the number of lactating cows must decline also. The autumn planner assumes that growth rate equals herd demand during the month before calving. In warmer regions, the rotation length does not need to increase as early, while in colder regions cows must be removed from the milking platform to allow the farm to recover.

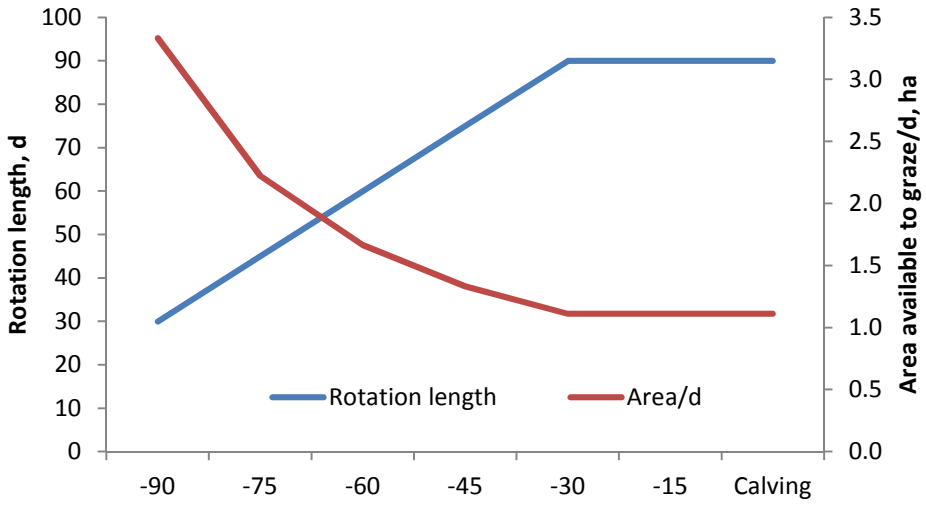

Figure 2. *The autumn planner dictates how much area can be allocated each day. This area is rationed between dry and lactating cows to ensure dry cows are allocated enough for condition score gain, while the milkers are allocated enough for maintenance and milk production. The provided example is a 100 ha farm.*

2. Spring pasture management

Summary statement: *Slow rotations allow greater total pasture growth and reduce the need for purchased supplements. Except in years when winter and spring pasture growth exceeds the norm, the appropriate spring rotation planner for the farm should be followed to maximise pasture growth and utilisation.*

Some of the most famous grazing research undertaken at Ruakura related to the allocation of pasture during spring. The specific experiment was presented at the Ruakura Farmers' Conference in 1986 by Bryant and L'Huillier. This experiment compared a low pasture cover at calving with an ideal scenario and investigated two management strategies:

a) maintain a slow rotation and allocate the available pasture each day, or
b) increase the area allocated to ensure that milking cows were well fed.

The main result of the experiment is presented in Figure 3. When the rotation was sped up, average farm cover declined and did not return to optimum until December. In other words, a short-term advantage in per cow feeding achieved through speeding up the rotation resulted in a large feed deficit for four months. In fact, for a 100 ha farm, the difference in pasture availability was 178 t DM or approximately 500 kg DM/cow (at 3 cows/ha). At $200/t DM, that is equivalent to more than $35,000/year.

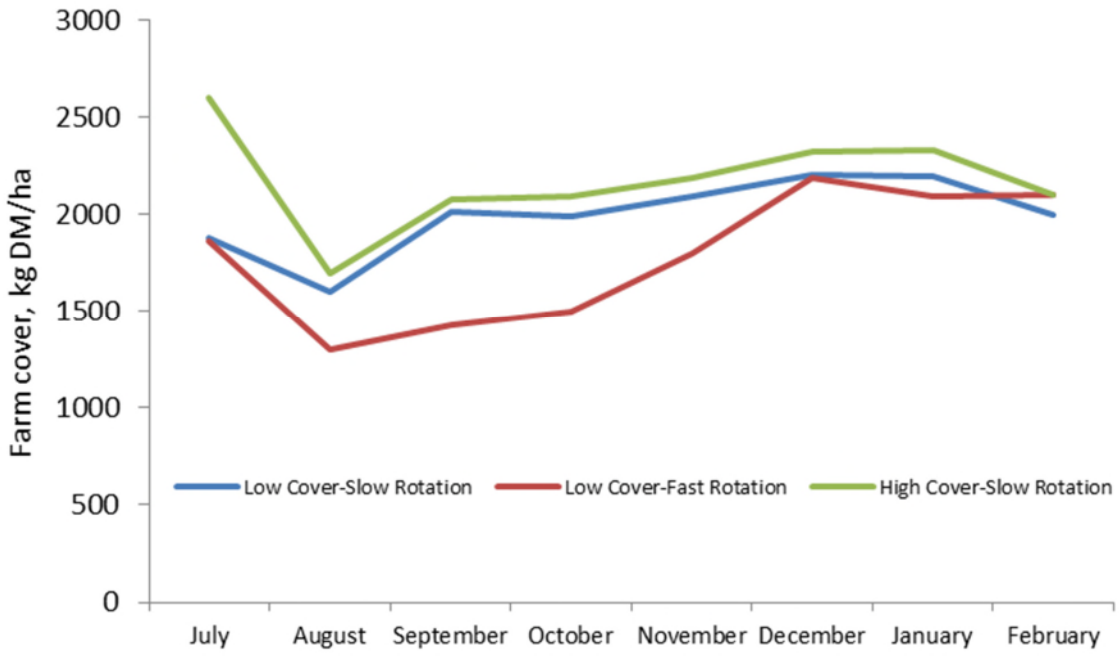

Figure 3. *The effect of rotation length in a feed deficit during spring on the long-term pasture cover (i.e., feed availability). Maintaining a slow rotation will return pasture covers to the target much sooner than a fast rotation during a spring deficit. Even though feeding cows more may seem like the right thing to do (fast rotation), it will result in lower covers for longer and extend the length of time to balance date. Adapted from Bryant & L'Huillier (1986)*[2].

This experiment led to the development of the ***Spring Rotation Planner*** (SRP), which took the 'guess-work' out of pasture allocation during spring. The SRP is ingenious in its simplicity. Like the autumn planner, the SRP assigns a specific area/day, and this area increases each day (Figure 4). At the outset, area allocated/day is small because all cows are dry. As the number of cows calved increases, so too does the area allocated. However, dry matter intake of milking cows is still low (approximately 13-15 kg DM for a 500 kg cow). The SRP accounts for the increase in cow dry matter intake by rapidly increasing the area allocated/day from 30 days post-calving.

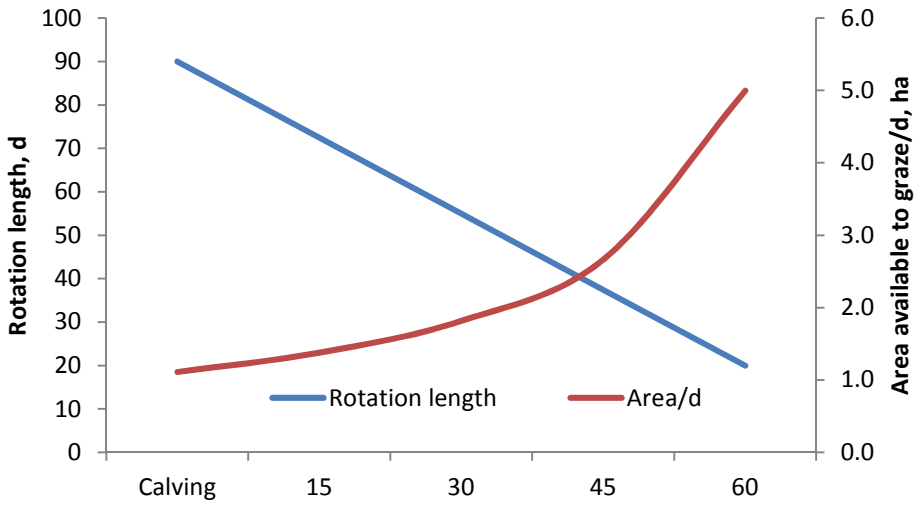

Figure 4. *The spring rotation planner dictates how much area should be allocated each day from calving to balance day. The farmer must ration this area between dry and lactating cows. The area allocated increases with time, matching the increasing number of cows calved and the increasing dry matter intake of the cows. The provided example is a 100 ha farm.*

An important aspect of the SRP is that it can be used throughout New Zealand, irrespective of stocking rate, breeding worth of the herd, breed of cow, or amount of purchased feed used. A line between rotation length at calving and desired rotation length at balance date dictates how much of the farm should be grazed each day. Heavier soils need to be managed carefully during wet weather, with on-off grazing and standing off options important to avoid pugging. However, the grazing rotation should not be sped up for more than a couple of days.

What the detractors claim

Summary statement*: Proper use of the spring rotation planner minimises the need for purchased supplement and lowers cost of producing a kg of milksolids.*

Detractors of the SRP refer to it in terms like 'controlled starvation'. **This is nonsense!** The SRP is a way to optimise pasture management. It does not determine whether you feed supplement or not. That is a decision each farmer must make based on feed availability at that time and looming feed deficits. However, by sticking to the SRP, you will minimise the size of the feed deficit and the amount of feed that will have to be purchased.

In wet weather, it is important to both protect the soil and protect the farm's cover. Therefore, on-off grazing and standing cows off for periods to avoid pugging is preferable to offering a greater area during wet weather. This cannot always be achieved, but increasing the area offered should be limited to only a few days during winter and spring.

Conclusions

Although there is no recipe for farming, successful farm businesses have a strategic plan that limit their exposure to external forces. Biologically, this means a stocking rate and calving date that suits the pasture growth profile, while, from a business perspective, it means limiting risk to changes in variable expenses (e.g., purchased feed).

In his book "Grass to Milk", McMeekan[6], stated "*No more powerful force exists for good or evil than the control of stocking rate in grassland farming. Properly understood and used, it can influence productive efficiency for good more than any other single controllable factor. Misunderstood and misapplied, it can lead to abuses which may have permanent harmful effects on land use*". We believe that the abuses that McMeekan referred to can be eliminated by having sets of decision rules around stocking rate, calving date, and pasture cover at calving.

Vital components of this plan are the ***Autumn Planner*** and the ***Spring Rotation Planner***. Both ensure that pasture growth and utilisation is optimised, while reducing the

impact of between year variability in pasture production related to climate and the discipline to apply these decision rules.

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