

## GRAZING SYSTEMS FOR WEED CONTROL:

## BETTER UTILISATION OF POOR QUALITY FEED

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**Abstract.** Since 1970 we have been running a typical grazing property on the Monaro using traditional management. However, in recent years we have questioned the use of continuous set stocking as a management system. Pasture decline and lack of flexibility have convinced us that we had to change. We now use Time Control Grazing on some of our heavy Poa tussock areas and have seen many benefits, including a decline in the amount of tussock present. In this paper we describe some of the management practices we use, including the use of supplementation to encourage consumption of lower quality feed. We find that the use of Time Control Grazing gives us better control of our paddocks, pasture composition, stock condition and drought planning.

Therese and I started in the grazing industry in 1970 by agisting a nearby property of 260 ha. We bought it after two years and added an adjoining property of 290 ha in 1978. The two properties are on the treeless Monaro plains area of south east NSW, with a 650mm rainfall. Soils are predominantly red and black basalt, and the area is undulating and rocky, with up to 60% arable.

We are traditionally heavy stockers, running 1100 ewes, 750 Merino wethers, 300 Merino hoggets, 85 cows and 40, 1 and 2 year old heifers, about 7.5 dse/ha overall.

The property has been under a long-term development program which involves subdivision into approximately 20 hectare paddocks. We plough what we can (in between the rocks!), sometimes spraying out, then sow with oats, followed by forage rape with pasture underneath. The pasture mix is usually Siroso phalaris, Concord rye, Perennial rye, Haifa white clover and, more recently, lucerne. We have a good sub-clover base.

About half the property is developed in this way. One block has a significant superphosphate history, up to 2.5 t/ha until 1980. The other has had less superphosphate, but both have had gypsum applied by air on a 3 year rotation since.

### Change in direction

Since 1985 we started to notice some changes. We were growing less grass, it recovered slower and persisted less. Some of our improved paddocks were 80-90% annual weeds within three years. If we didn't get an autumn break and the barley grass didn't grow, we were in trouble. We were typical of properties that were experiencing pasture decline and, in our opinion,

we were helping it along by heavy continuous set stocking.

What could we do about it? We could plough and sow faster and more often, but this was expensive. We could spray-graze our annual grasses, but we relied on them for feed. We could go into High Input grazing with lots of fertiliser. That seemed both risky and expensive with our variable rainfall. Perhaps it was worth changing our grazing management?

We did a stock-take. What did we have? We had half our areas "improved", with some perennial grasses, some improved clover, a lot of annual grasses, plenty of bare spaces to grow weeds, and some remnant native grasses. The other half was Poa tussock basically, with a small percentage of *Danthonia*, and a large number of other native grasses of unknown value, because we never saw them. We also had sheep camps dominated by annual grasses and various imported weeds. All in all, a typical grazing property pasture analysis!

In 1993, I attended a "Grazing For Profit" school and was introduced to "Time Control Grazing", and this appeared to be the answer. Here was a grazing system that treated the pasture, soil, climate and farm as a whole. We knew everything was related. Why then did we treat each problem that came up so specifically? Perhaps they weren't problems after all? Perhaps we could use them to our (and our stock's) advantage?

### Grazing management of Poa tussock grassland

#### Subdivision

We have applied Time Control Grazing to an area

of 190 ha of native Poa tussock land, with 80% surface area covered with Poa. We use a two live wire electric fence to subdivide the area into 21 paddocks, each approximately 9 ha. Wires are set at nose height for both sheep and cattle, about 400mm and 800mm high. New animals to the system always try the fence with their noses, usually only once. Post spacing of 20 metres minimum is used except for ridges and gullies. Posts are 20mm mild steel rod, 1.2m long with two Gallagher G656 screw-on rod insulators, with a total cost of \$2.40. The wires are only pulled up tight by hand, so single post end-assemblies are adequate. Twelve paddocks radiate from a central watering point, with the others being two original paddocks sub-divided into four and five paddocks each.

The total cost per kilometre is \$332.50, made up of:

- 55 posts @ \$2.40 132.50
- 4 end insulators @ \$1 4.00
- 2 coils 12.5g Flexibel wire @ \$98 196.00

### **Combining stock**

760 wethers from 2 to 5 years old were put together with 66 cows giving a stocking rate of 7 dse per hectare. This stocking rate for the year is converted to a stock density of 85 sheep and 7 cows per hectare for their time in the paddock. They eat the most palatable grass first but then go on to the Poa tussock. This opens up the Poa stand, letting light in and allowing better grasses and clovers to grow.

In a normal set stocked paddock, patch or uneven grazing will occur. Individual plants will be continually overgrazed, eventually weakening them. Other plants or areas will be untouched, in our case the Poa tussock. Only the areas between will be grazed and usually overgrazed. This weakens those plants while the Poa grows away.

Another advantage of having a high stock density on a small area, however briefly, is the trampled, tumbled effect the stock have on the tussocks. Pieces are pulled out of them, they are walked on and over, and a lot of manure is distributed through them. This we think will eventually weaken the tussocks.

We do not want to get rid of them entirely, just thin them out and have them in a much more palatable condition without the dead centres, and with plenty of new green growth on them. Trials have shown that Poa tussock has equal growth rate but less palatability than improved pasture.

Short-term high stock density grazing results in lots of dead stems and leaves and grass segments left on the ground surface as mulch, and eventually as or-

ganic matter in the soil. The mulch retains soil moisture and returns tied-up nutrients to the soil.

### **Stock movement**

The time stock are in each paddock is determined by the growth rate of the grass. If the pasture is growing quickly it needs only a short rest period but, if growing slower, a longer rest period.

$$\text{Graze Period} = \text{Rest Period/Paddocks Resting}$$

However, in the particularly heavy Poa tussock paddocks, an extra 1 or 2 days grazing is taken out. Sometimes the cattle can be left in for an extra 2 or 3 days with some supplementation. At certain times of the year (from calf weaning to 30 days before calving) cows can be used to really work over heavy tussock stands. However, they need Urea block supplements at these times. Hay can be fed through the tussocks to increase the animal impact on them.

### **Grazing pressure**

This is achieved by high stock density - up to 200 sheep per hectare is OK. Each time the paddock is grazed it is grazed more evenly until the optimum grazing pressure is achieved, ie, each plant is only bitten once. Grazing pressure applied to Poa tussock pastures results in each tussock being eaten down in stages, perhaps over 5-10 grazes in 2-3 years. It doesn't happen all at once, and depends on tussock size and how ruthless you are - some tussocks can be waist high and 600 mm across at the base!

Poa tussocks grow vegetatively and from seed. Vegetative increase sees new plantlets develop around the outside of the clump with the middle dying out eventually. These dead centres need to be pulled out, trampled in and dispersed. They provide ideal seedbeds for new grass and clover plants to develop and add organic matter to the soil.

## **Some management aids**

### **Fire**

In very heavy tussock areas, a cool burn may help in the reduction of tussock size and thickness. However, burning only helps tussocks grow more vigorously, so grazing pressure will need to be applied regularly to these areas. This is possible in small paddocks with large numbers of stock. Rest periods need to be maintained with short heavy Graze periods to keep the tussocks down, while giving the new better grasses and clovers a chance to strengthen and take over.

### **Herd effect**

This is a more violent use of the animals' hooves to work over an area. It may be used to revegetate a

bare area by applying seed or seedy hay and driving the animals around it, preferably during or after rain. We use it to work over thick tussock areas. By feeding a bale of hay, spread in thin biscuits over the area the stock trample the tussocks down, allowing light in, and valuable grass and clovers soon appear. This is a method of changing small areas within a paddock, and is probably not suitable for large areas, although it can have striking effects. Feeding blocks in the thickest tussock areas and moving them daily can have the same effect.

### Soil activity

While the increased amount of mulch and dead material on the soil surface from the high grazing pressure and increased hoof activity improve soil moisture, soil biota activity will also increase. By introducing new and improved species of earthworms and dung-beetles to your pastures, advantage can be taken of the improved soil conditions. Because the manure from the larger mob is spread over each 9 hectare paddock for a short period, the dung-beetles have a greater opportunity to cultivate and bury this most valuable asset.

### Seeding

We are presently experimenting with methods of seeding paddocks using the stock to spread the seed within their manure. Seed blocks similar to seed bells for aviary birds (seed glued together) are to be used. Apparently up to 80% of clover and medic seed will pass through sheep and cattle and remain viable, and up to 40% of grass seed. This area needs more investigation and I would welcome any suggestions. Alternatively, sod-seeding immediately after heavier grazing can be done, with the mob being circulated around the paddock afterwards.

### Supplementation

Supplementary feeding provides one or more of the missing minerals, protein, energy, vitamins or trace elements in an animal's diet, a deficiency of which could limit production. A cow, for example, can over-eat by 40% to make up for a deficient portion of her diet. If we could maintain the balance correctly we could run more stock or the existing stock better.

I realised when I was preparing this paper that I wasn't an expert on animal nutrition. I hope everyone here is because our livelihoods depend on giving our animals nutritionally complete and adequate diets, both for maintenance and production.

One concept which we need to accept when thinking of supplementation is that, *stock are smarter than we think*. I believe they can recognise what is lacking in their diets. For example, most overeating of supple-

ments and thus poisoning occurs when one substance masks another (eg. urea and molasses).

### Hay and grain

These are the usual supplements fed when protein or energy respectively are deficient. Good quality (ie, high protein) hay is used both as a supplement and as an inducer of animal impact on dense tussock stands. The impact of feeding hay in dense tussocks can be spectacular, especially when the ground is wet. This treatment will mulch up the tussocks. Black thistles seem to be the first to colonise but then the better grasses and clovers take over.

Hay tends to be a substitution feed, but this is more so with low quality hay which just replaces the feed the stock are eating already. Grain fed in trails or troughs, or combinations of grain and urea, or grain and lupins in Trickle Drums are options to supply energy and/or protein.

### Blocks

This is a crude method of supplementation which is especially effective with Poa tussock utilisation. Blocks have an effect in two ways. Firstly, by supplying non-protein nitrogen (NPN) in the form of Urea to animals grazing Poa tussock (which has reasonable energy levels but low protein levels). Note that NPN can have disappointing results when increased nutrition is required, such as for lactation. In this case, a higher-quality form of protein (By-pass protein) is required to make up deficiencies in the supply of microbial protein from the rumen bacteria.

Secondly, the herd effect caused by the animals at each block site is invaluable in reducing the density of the tussock stand. We try to move the blocks each day or place them on a sloping site, where the stock will move them downhill themselves. Blocks must be fed in sufficient numbers to allow each animal continuous access. This is probably the biggest mistake made when using blocks - not enough for the size of the mob.

Urea blocks are mainly of value in drier seasons when tussock intake becomes necessary for the stock due to lack of good quality grass between the tussocks. However, with the higher stock densities that we have, some tussock is consumed in each paddock and blocks are available to them at all times. Intake of blocks is reduced by the stock as green pasture becomes available. Stock know when they need them. Note that blocks are an expensive form of supplementation.

### Mineral trough mix

We are experimenting with a mineral-meal mix fed in a trough 3 meters long which is moved as the stock are moved. The meal portion supplies by-pass protein

which is necessary for high demand periods such as lactation and flushing of stock. The proportion of meal in the mix can be varied as this demand changes. The mix also supplies urea (NPN) and a full mineral diet as well. Mixes are available as commercial preparations (eg. 'SIROMIN', developed by CSIRO for stock on summer stubble in Western Australia).

### **Mineral bar**

We are testing this as well. It consists of a covered trailer which has separate containers of each of a number of minerals, meals and trace elements, individually available. Assuming the stock know which they need at any particular time, this system makes the element, mineral or protein source available to them in a less-wasteful way than using mixes. The trailer is moved to each paddock with the stock and has the same resultant animal impact around it. Both the bar and the trough can be used as a signal for the stock to move. I think the mineral bar has the greatest potential and, with more experimentation, will solve a lot of production problems. Hin-Gee (Rural), South Australia has commercial preparations available. We would like to hear from anyone who has experience in this area.

### **Water-soluble supplement**

Commercial mineral preparations can be metered out with the stock water, because all animals drink at the one site. A lot of work has been done on this in Queensland. However, it is probably not as applicable in our cooler climate, as water is not so necessary throughout the year.

### **Other**

Some work is being done in America on the benefits of liquid alcohol supplementation and on pH buffer feeding. Urine analysis for pH is very helpful in deciding what supplement is needed. Acid pH means there is an excess of energy in the diet, and alkaline pH an excess of protein. If we could keep the diet balanced, overeating of one food type or another could be prevented, and there would be less wastage, allowing more stock to be run or the same stock run better. Manure analysis for nitrogen content is also available. Perhaps we need to observe the manure characteristics as there are valuable clues there to our animals needs.

The principle behind all supplementation is realising what the animals needs are at any particular time of the year and supplying them. We need to know what properties and qualities, or lack of, our pasture has at each stage of the season and provide the deficiency to them. Most pastures have a deficiency of some form - we need to recognise it and provide it, or live with the resultant lower productivity. Perhaps if the supplement is in front of them in a "Sandwich Bar Help Yourself" trailer the stock can supplement them-

selves.

There is one vitally important point that must be remembered. If you force stock to consume feed (in this case, *Poa tussock*) and they do not wish to, you will suffer from some degree of production loss and, therefore, you will need to supplement.

### **Control by grazing management**

Time Control Grazing gives you control of your stock and their condition. You can, by speeding up your paddock moves (shorter Graze periods), flush ewes or cows before joining, for example. By moving slower, more grazing pressure can be put on a particular area if increasing condition is not a priority. Cows and calves can be moved ahead of the wethers if their feed quality needs are greater at that time.

We aim to have our steer weaners at 275 kg liveweight by mid April. The cows and calves are moved ahead of the sheep to give them access to better quality pasture during spring, summer and early autumn. After the steers are sold and the heifers weaned, the cows then follow the sheep until a month before calving or as their condition warrants. The mobs travel together for most of the year, but priority can be given to either by moving them ahead.

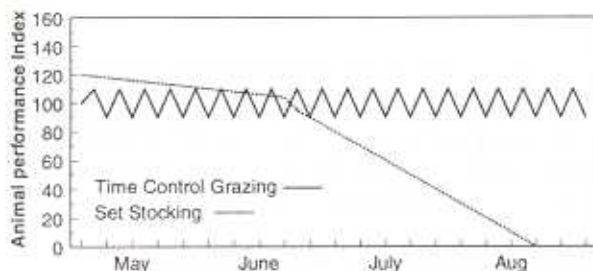
### **Control of paddocks**

By moving more slowly (or grazing each paddock longer) grazing pressure can be applied to particular paddocks. By using movable electric tapes, areas can be left ungrazed or paddocks can be divided to give even greater grazing pressure. These tapes or portable electric fences are invaluable aids to control of the condition of the pasture in your paddocks.

### **Control of species composition**

If you wish to decrease a particular species in a paddock, graze heavily at the plant's weakest time (*ie.* just before and during flowering and seeding). This will reduce dominance of annuals, but repeated grazing each year may be needed. Conversely, grazing management will allow a particular favoured species (*eg.* *Danthonia*, *Microlaena* or Cocksfoot) to increase in density by grazing at its strongest time and protecting it at flowering and seeding. *Phalaris* pastures can be made more palatable and nutritious by careful grazing management. This is made easier by having a large mob size and small paddock size, equating to "Grazing Control".

We are aiming to have a vigorous pasture stand of summer and winter growing perennial grasses with a variety of medics and clovers. Annual grasses will also be valuable components of our pastures, giving bulk at certain time of the year. However, we will be able to



Adapted from Savory (1988)

**Figure 1.** Animal performance - Time Control Grazing vs Set Stocking.

control them at their damaging stages. We are not overly concerned about thistles and weeds, especially tap-rooted ones. Grazing pressure will weaken some by defoliation. Others will mature but have most of their seedheads eaten or greatly reduced and will eventually die. The subsequent death of their tap-roots will open up the soil. We need the full diversity of plants in our grazing system.

The greatest difficulty in driving this Grazing Management System is balancing the improvement to the pasture with the animal production aspect - the dollars and cents. I think that if you are improving your pasture (in this case, by grazing pressure on *Poa tussock*), your animal performance may suffer briefly. However, by offering the stock grass rested for 40, 60 or 90 days on their next move, their performance is balanced out (Figure 1). Under this system, production follows the top line of the graph as opposed to the set stocking graph line where quantity, quality and digestibility are deteriorating as winter progresses.

As an example, we had a fairly dry period without much growth from December 1993 to mid April 1994. At the same stocking rates, our wethers and cows on the native, Controlled Grazed block were in better order than the ewes on our improved, Set Stocked area.

Stock health appears to be better than with set-stocked country. Effectively they are going on to clean grass every 2-3 days. There is potential with the supplementation program to dispense drench, vitamins or minerals as health control measures.

Now that we are looking *into* our pastures more often, we are gaining pasture analysis skills including growth measurement, growth habit and species identification. We have a reasonable drought or dry spell prediction ability because we know the number of grazing days left in each of our paddocks. We can see it - simply count the paddocks and count the days.

## Conclusion

We have found that Time Control Grazing has given us many benefits, including control over our paddocks, pastures and animal condition. Perhaps you may like to consider these questions:

- Are you happy with your farm's performance?
- Are your pastures getting worse?
- Are your inputs always going to be available?
- Can you maintain your stocking rate.

If not, *perhaps continuous set stocking is not working for you either.*

## Acknowledgments

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## Reference

- Savory, A. (1988). "Holistic Resource Management". Island Press.