# A GREENFEED SORGHUM AND SUB-CLOVER SYSTEM FOR DAIRY PRODUCTION

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## INTRODUCTION

My dairy farm is 3 km inland from Doubtless Bay on the east coast of the far north of Northland. It has a total area of 137 ha, of which 112 ha is in ryegrass/white clover pasture and 11.2 ha is set aside for forage cropping. About half of the grassed area is made up of rolling Waikare clay hills on which machinery can only work safely in summer. The balance is flat land made up of four major soil types comprising Hukerenui silt loam, Waipu clay, Kara silt loam and Otonga peat. With the exception of the peat, these soils are badly weathered and moderately to strongly podsolized, and consequently have a heavy clay texture with poor drainage and low natural fertility. This is a common situation over much of Northland.

Rainfall on the property varies between 1000 and 1500 mm per annum, but this is not the most significant feature of the climate.

– Day-time maximum temperatures in winter seldom fall below 14°C, so although most rain falls through this period, pasture growth continues during winter at a reasonable rate, particularly on free-draining soils.

– High summer temperatures along with frequent steady winds rapidly dry out pastures and nullify the effect of any worthwhile summer rain that may fall.

Any substantial variation from these patterns is an exception.

## PAST MANAGEMENT

In the past, before cropping and conservation was started on the property, management was reasonably conventional for the district. Cows were wintered on hay and rough feed on a waste area, then flushed on grass before calving. After this they were fed as much grass as was available throughout the season. Sufficient feed was always available until early December, then with the hay paddocks still out of the rotation, increasing pressure was gradually applied to the wilting, deteriorating pasture cover. By mid-January, herd production would have fallen below 0.5 kg fat $cow^{-1}$ $day^{-1}$ and would continue to fall until the cows dried off around March or stuttered along into May – entirely at the mercy of the autumn rains. This loss of any consistent summer and autumn pasture/milk production was serious enough in itself, but probably even more serious was the loss in cow body weight that inevitably occurred at the same time. Hay was often fed to try and improve their feed intake, but one could never feed enough and ensure that an adequate amount was left for wintering.

The end result was that cows went into winter in poor condition and with insufficient time to recover before calving. This in turn led to depressed peak production, and on into summer for the cycle to repeat itself.

In an attempt to improve summer feed supply I planted a small area of a greenfeed sorghum four to five years ago. Shortly afterwards I was invited to have my farm involved in a programme aimed at improving dairy production in the district. Organisers of the programme were Tony Taylor of the DSIR, Norm Hart of the MAF Advisory Service and Heath Harris, one of our Dairy Company vets. The programme had some additional funding from the Hine Rangi ,Trust which operates in Northland to improve agriculture. I will not go through the trials and changes that have taken place over the last few years, but will describe the supplementary feeding system as it has evolved at the present time.

## PRESENT MANAGEMENT

Two hectares of soft turnips were grown for feeding around Christmas. These were made to last for 25 days until the greenfeed sorghum was ready for grazing on 20 January. These turnips provided around 2.65 kg DM $cow^{-1}$ $day^{-1}$ over this period. It has since been agreed that quality pasture silage could be a simpler supplement to use during this short and variable period, so the 2 ha has been put back into pasture.

The main summer supplementary crop grown was a greenfeed sorghum variety Sudax SX6. This was grown on 11.2 ha of the Waipu clay. The ground was prepared during November when it is usually very hard, requiring disc ploughing or giant discing followed by rolling and more discing until a final cut with a rotary hoe produces a suitable seedbed. Seed was drilled in 5 cm deep at 22 kg $ha^{-1}$ between 15 November to 15 December, when temperatures were high enough to give rapid establishment. Fertiliser was put on during final seedbed preparation at 750 kg $ha^{-1}$ of 30% potassic superphosphate and 250 kg $ha^{-1}$ of ammonium sulphate. Lime was also supplied, depending on the results of the soil tests.

In 1977/78, a good crop was grown and grazing began about seven weeks after sowing, when the crop was 1 metre high. Hot wires were used to control grazing, both in front and behind the herd. Towards the end of the first grazing the Sudax was beginning to produce seed heads, but I was prepared to sacrifice some quality to try and obtain a reasonably even feed intake throughout the summer. We have not had any weed problems in the Sudax and only about half the area was sprayed once for army caterpillars.

The rate of Sudax regrowth and rate at which we graze enables three grazings to be made on

TABLE 1. Improved farm and animal production following introduction of forage crops.

| | Seasons | | | | |
|---|---|---|---|---|---|
| | 73/74 | 74/75 | 75/76 | 76/77 | 77/78 |
| Farm production in kg milk fat | 15,996 | 18,123 | 21,161 | 27,054 | 27,669 |
| Production kg fat $cow^{-1}$ | 86.5 | 97.9 | 114.4 | 143.1 | 146.3 |
| Mean post calving (August) live weight in kg | - | - | 300 | 350 | 395 |
| Kaitaia Dairy Company Production kg fat $cow^{-1}$ | 91.9 | 98 | 107 | 111.9 | |

approximately 6 ha and two grazings on the remainder. Each Sudax grazing produces about 4000 kg DM $ha^{-1}$, giving an average total yield of 10,000 kg DM $ha^{-1}$.

Last season we were able to put in 14.2 ha of wilted fine chop pasture silage, whereas previously only hay had been conserved. I mowed the grass and consolidated the stack, while a contractor did the rest of the job for \$57 $ha^{-1}$. Earlier cutting of spring surpluses for silage was done to get better early summer pasture recovery and to provide a conserved feed capable of taking up shortages in the supply of Sudax. This silage was fed out for 70 days ending on 15 April – it was spread out on the regular night paddocks with a borrowed self-unloading forage wagon. On average, the cows received 5.0 kg DM $day^{-1}$ of silage and 6.5 kg DM $day^{-1}$ from Sudax – this left little to be provided from the pasture.

So while stocking rate has stayed constant at around 15 s.u. per ha and the start of calving has remained around 12 July, there has been a substantial increase in feeding through January, February and March. This extra feed has permitted a longer lactation, considerably reduced summer over-grazing and enabled better body condition to be maintained through to calving.

All these things have contributed to a substantial increase in per cow production and farm production (Table 1).

Costs involved in this extra feeding have occurred largely in Sudax establishment at \$120 $ha^{-1}$ and in silage contracting costs at \$57 $ha^{-1}$. At last year's payout of 163c $kg^{-1}$ of fat, these costs would have required an extra 1382 kg of fat to break even. It is clear that production has improved by nearly ten times over this break-even figure and that body weight also has improved dramatically. During the last few seasons, summer rainfall has tended to improve, giving a lift in district production which is seen in the Dairy Company figures – this will also have contributed to improved production on the property (Table 1).

There was one other factor that influenced last season's production, and which could hold the key to any future significant production increases. Last year, Tony Taylor supplied me with seed of a *Trifolium subterraneum* cv. Woogenellup and 4 ha was sown on part of the area out of Sudax.

The idea was to see if Woogenellup could produce late winter and spring feed on the Sudax area, improve soil nitrogen levels and reseed naturally. Seed was sown rather late in May and production through winter and early spring was very disappointing. However, from late September it literally took off and five weeks later had grown into a reasonably tall and dense stand. This was grazed in mid-October when it contained around 3300 kg DM $ha^{-1}$, and subsequent regrowth of 1800 kg DM $ha^{-1}$ was grazed in mid-November. Happily, cows did not bloat on the sub-clover, despite our fears that they might. Having additional good milking feed at this time was very useful because it allowed us to shut up 14.2 ha of pasture for silage.

Another improvement resulting from use of the sub-clover was on soil structure. Cultivation to produce a seedbed for the Sudax was much easier than it had been in the past. Self regeneration of the Woogenellup also looks promising. This July, a good stand of Woogenellup was present over 75% of the area sown in the previous year and smaller seedlings were scattered over the rest of the area. The good areas had produced the equivalent of 2000 kg DM $ha^{1}$ which is a major improvement over the rate of establishment in the first year, so we are now hopeful of getting three good spring grazings. Because of these promising results, the rest of the Sudax area was sown to sub-clover this autumn.

## THE FUTURE

Over the last three years I have had a lot of help and advice from the DSIR, MAF and local vets, and also some financial assistance for field trials with new forage species. We must now ask ourselves what we have achieved and what we have got to offer to other farmers in our area and elsewhere, who could be facing the same problems as we did initially.

Farmers are always reluctant to change any system merely for the sake of change, but I feel that we have been able to eliminate many of the risks involved by using trials and by careful documentation of results. We can offer advice about different soil types; the establishment, management and yield of several forage crops; and stock management, stock health and production responses. We have the costs of crop establishment and the capital cost of machinery that is required. We have evolved a two-crop system that works and fitted it into a full twelve-month farming operation.

With a four year average of 110 kg fat per cow at the local Dairy Company, there is obviously considerable scope for improvement. The increases in production that we have shown to be possible should be incentive enough to those with suitable conditions to lift their production to far more profitable levels.