PASTURE ESTABLISHMENT ON SWAMP LAND ON A BAY OF PLENTY DAIRY FARM

W. M. REYNOLDS, Thornton, Whakatane

Because the initial establishment of grass on swamp country today generally follows a set pattern, with the use of heavy machinery, most of this paper will be concerned with the maintenance of pasture on such land. This latter aspect is the keynote to efficient grassland farming on wet country. It requires constant vigilance by the occupier; if there is any easing up, the pasture will soon revert to rushes and weed grasses and the soil will become waterlogged.

I will describe an area of 150 acres on my dairy farm at Thornton on the Rangitaiki Plains. The total area of the farm is 300 acres and it was part of a block settled in 1913. Then it was mostly a swamp covered in manuka, flax, raupo, rushes, and willows. A large part of the development, drainage, and grassing was done over the period 1919 to 1930, and today the farm is all cultivated.

On the Rangitaiki Plains 12,500 acres is at present being drained by pumping and the removal of this surplus ground water is the heart of profitable farming on this land. This 150 acres is typical and in so far as drainage is concerned it is a self-contained unit. Eighty acres are too low for drainage to be effected by gravitation and so this area is pumped. However, since the other 70 acres of higher land is also in the watershed, it contributes an equal amount of water and so is also included in the pumping scheme.

The scheme involved erecting a stopbank, digging farm drains, and building a pumping station. The capital cost of this scheme was £1,800, which includes power reticulation, pump, motor, concrete foundations, and housing for the machinery.

The water is lifted to a height of 6 ft 6 in. and is discharged into an outlet drain on the higher land, which ultimately takes it into the Drainage Board canal system. This pump has a rated capacity of 150,000 gallons per hour. The capacity of pumping schemes is generally calculated on the basis of 1,000 gallons per acre per hour. This allows for removal of 1 in. of rain per day, although 20 hours is allowed for actual pumping and 4 hours for power shutdowns, etc.

The cost of maintaining an efficient pumping scheme is considerable and is a permanent annual charge. In this instance it is £1 per acre per year and it involves the whole of the 150 acres. On a per acre basis the power charge is 8s.; interest, depreciation,

and repayment on plant is 8s.; and the cost of maintaining the larger drains is 4s. Over and above these costs, of course, are the drainage rates of 9s. per acre.

Added to these charges is the cost of maintaining the smaller farm drains where both machinery and chemical weedkillers are used.

On this 150 acres are 23 miles of drains, which is $1\frac{1}{4}$ chains per acre. The larger feeder drains are 10 ft wide and 8 ft deep and the remainder are 4 ft and 4 ft respectively.

Cultivation

Pasture establishment on swamp country is not completed with the emergence of grass and clover plants. In fact it could be said that the grasslands on such country have to be re-established every year. However, unless stock movements, grazing, and water levels are all very carefully controlled, the sown species can disappear over one season. Hence my previous statement that on swamp land maintenance of pasture is our main concern and worry. An engineer can install a pumping scheme and sow down a pasture, but only a farmer can keep it there.

Only about two-thirds of this 150 acres is topdressed and potassic superphosphate at 3 cwt per acre is used. Some of the land has had no artificial fertiliser but is growing a good sole of grass.

On the lower country a typical soil profile is:

- 1½ in. dark brown loam
- 3 in. Tarawera ash
- 14 in. friable brown peaty loam
- 9 in. yellowish white loam
- 6 in. Kaharoa ash on brown fibrous peat

Ploughing, particularly deep ploughing, should be avoided if at all possible. The peat is close to the surface and over-drying caused by exposure to the air hastens subsidence considerably. This cannot be avoided completely, but it can be minimised. On pasture land the average subsidence is about $\frac{3}{4}$ in. per year. After cultivation and excessive drying a drop of 6 in. has been recorded. The ideal would be to maintain a constant water level throughout the year, but this is not economical. A close approach can be made by draining as efficiently as possible during wet conditions and not draining at all before and during dry weather. Virtually this means pumping in the winter and spring only.

Rotary hoeing has a much less detrimental effect than ploughing. Unless there is a particular job to be done such as breaking up a paspalum-bound sward or levelling, it is not advisable to cultivate again after the initial sowing down.

The most useful pasture plants on this land are the ryegrasses, paspalum, and white clover. Under optimum management these grasses will suppress other species such as timothy and cocksfoot. So in my opinion, until another plant appears which will dominate any or all of these species, stay with this mixture and look after it well.

For best results over a long term, grazing must be on the on-and-off principle. Even light pugging must be avoided, and this is probably the most difficult feature of our all-year-round farming. In practice it is virtually impossible to carry the same number of stock throughout the year. The alternative is to use a run-off, either within the farm or away from it. I use a 60-acre coastal sand country area, half grassed and half sand dunes and lupins.

On swamp land some winter grazing can be done, either lightly on and off or else by small groups of stock scattered throughout the farm. However, I do not do this, as much better results are obtained by closing the whole farm by mid May. The sward need not be eaten bare. The "Wallace system" is ideal, as on this country grass will continue to make good growth through winter, providing it is growing when winter comes.

The year-round grazing programme I follow is: January to mid April, on-and-off grazing with as many stock as can be carried. Areas tending to become paspalum dominant must be stocked heavily and often, and even under this management sufficient ryegrass and clover will reseed. From April to mid May feed out hay or silage and do this particularly where the desired species are thin. Preferably feed hay cut from a similar area; if it is fed at the rate of 40 bales per acre, a good seed coverage is obtained. This is satisfactory under reasonably dry conditions, but in wet weather it is more important not to pug than to reseed. Invariably pugging results in a bumper crop of weeds. So under adverse conditions protect the pasture already there and leave renovation for some other time.

By late June when the earlier closed paddocks have 8 to 10 in. of growth, break-feeding is started. Grazing should not be too heavy, as the recovery is more rapid if some length is left. As a yardstick there should be no sign of mud or pugging more than a chain from the gate and only small evidence of where the preceding day's electric fence was. Grazed at this rate it would be ready again within 40 days. Excessive grazing, one day more, could extend this to 60 days and also damage the sward. Clover suppression must be avoided, although there is more latitude on this country than on drier soils, and this grazing policy does appear to be conducive to clover survival. From mid August onwards

on-and-off grazing is continued, while break-feeding ceases due to the herd size being big enough to eat out a paddock between milkings. Generally by October there is surplus feed and this is made into silage. The problem here is that if conditions are wet, machinery bogs, even when the standing grass has dried.

Conditions are not generally suitable for hay until mid December, as, due to soil dampness, the cut material is slow drying. We keep hay and silage crops relatively light, mainly to allow maximum light into the sward base but also to reduce machinery difficulties on wet ground.

There are two classes of weeds. Rushes and swamp grasses can be fairly well controlled by grazing practices coupled with spraying. The other class includes those weeds induced by pugging, and a good degree of control is obtained by oversowing immediately.

This has to be followed up by topping as some of the worst weeds such as willow weed (*Polygonum persicaria*) and stinking mayweed (*Anthemis cotula*) are resistant to sprays.

The main aim over a long term with this policy as outlined is to have a dense, close-cropped sward, and a concentration of plants, rather than an open sward with better growing individual plants.

DISCUSSION

Comment (D. Sears): For good growth of young pastures it is important that the soil should be well consolidated. It is essential to get light into young pastures for the growth of **clovers** and tiller development of the grasses.

Bloat used to be a problem on your farm a few years ago Mr Reynolds, what is the bloat situation now and what change has taken place since the earlier period when prairie and white clover were the dominant species?

- A. We still have bloat. Prairie grass is still present but is being superseded by ryegrass.
- Q. (H. S. Gibbs): Mr Reynolds mentioned the problem of pugging on his farm. Is gravelly material an advantage in preventing pugging?
- A. No. Tarawera ash does not help. Pugging cannot be avoided except by avoiding mob stocking in wet conditions.
- Q. (I. L. Elliot): The cost of pumping was roughly equivalent to the cost of applying 1 cwt of superphosphate. In view of the relatively low cost of pumping could it be profitably employed to a much greater extent on the low lying country?
- A. The average cost of pumping was fl.O.O. an acre and I agree that the use of pumping could be greatly extended.
- Q. (G. Banfield): Does Mr Reynolds adopt any method of stock manipulation in very wet periods.
- A. It was not necessary to reduce stocking intensity but you must be careful not to have the stock on wet paddocks when there is less than three inches of pasture growth. A pasture which had about eight inches of growth on it withstood pugging reasonably well.