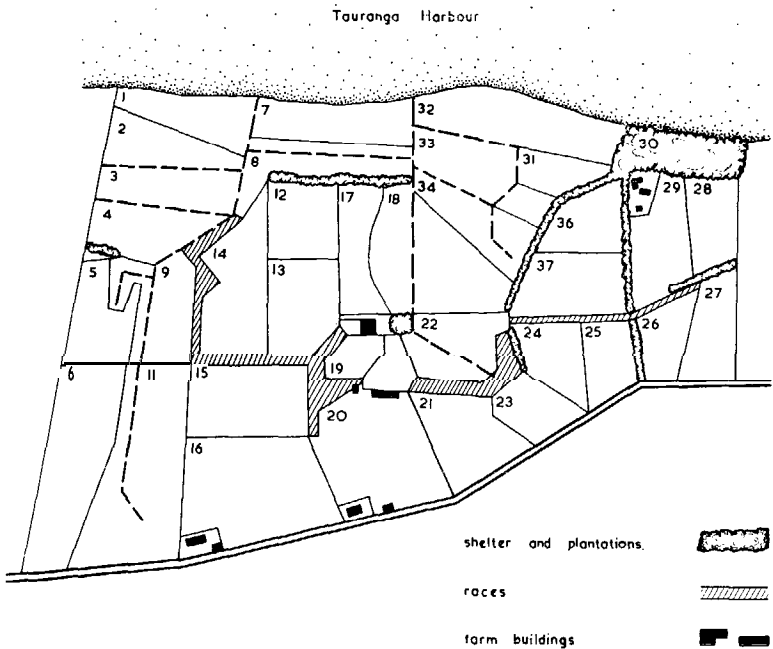


THE USE OF SHORT-ROTATION RYEGRASS ON A BAY OF PLENTY FARM

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The farm is situated on an arm of the Tauranga Harbour, on the Omokoroa Peninsula, 12 miles north of Tauranga and is on a narrow strip of rolling country between the Kaimai Hills and the sea. The land on this peninsula consists of a ridge down the centre, with rolling lands going down to sandy swamps and flats on each side. The farm is divided into three by two shallow gullies, which drain a considerable water-shed above the farm, necessitating a lot of draining.



The total area of my property is 130 acres; of these, 78 are of good rich volcanic ash, Katikati sandy loam type, 13 acres are light, sandy swamp mixed with peat and loam, 25 acres of sandy flats, 7 acres of sidings, and 7 acres covered by the sea at high tides. Some of the sidings have been planted in trees, because they are too steep for grazing and some as shelter belts, for, as the farm lies west, which is very much into the prevailing wind, shelter must be provided for the pastures as well as the stock. There is nothing like a Bay of Plenty west wind blowing off **the** Kaimais for weeks on end to stop grass growing.

The total grazing land available for the 93 milking cows and the 40 head of young **stock** replacements is 115 acres and of these only 78 are really highly productive, producing about 300lb. of fat per acre against the sandy flats at well under 200lb. per acre.

Quite a lot of subdivision has been carried out and the farm is divided into 33 paddocks, mostly about $3\frac{1}{2}$ acres. All paddocks are watered **and** nearly all can be reached by a system of races, without crossing other paddocks.

Weather conditions are important, but especially so on light country, and rainfall records have been kept since 1952. It can be seen from the table that yearly rainfall is fairly constant, but that every year, nearly half the year's rainfall fell on 15 days. But what cannot be seen from the total year's rainfall is the reason for the fall of 4000lb. in butterfat in 1954. This was because only 6in. fell in 4 months, which in these light soils is quite a drought. It shows that the spread of rain is more important than the yearly average. Dry summers are the rule rather than the exception and as winters are comparatively mild, some grasses will grow better through the winter than through the summer. This is where ryegrass and especially short-rotation ryegrass is so valuable.

I have occupied this property since 1934, but for the purpose of this paper it is proposed to go back only as far as 1946, as during the war, when I was absent serving overseas, the pastures deteriorated to such an extent owing to neglect and lack of fertiliser that it was necessary to start all over again when I returned.

The first year after the war proved a disaster. Seventy-three cows were milked and such was the severity of the drought, combined with the lack of topdressing, that 33 would have been too many. The total butterfat in that year was 10,000lb. and the total net income was £5, my gratuity being spent on a bore and water piping to give thirsty cows a drink.

During the war tall fescue spread rapidly into most paddocks and farming operations have been toward eradication of this

weed and substitution with good grasses. However, before this could be done, the fertility level of the soil had to be raised, The use of the electric fence appeared to be a great help, so this was put into operation along with topdressing, harrowing, subdividing, etc.

In the 1951-52 season a start was made in ploughing up and regrassing and a paspalum sodbound pasture was ploughed in February, and on 14 March sown down with 25lb. of short-rotation ryegrass, 6lb. of red clover, and 2lb. of white clover. The rainfall for March was .80in. and April was not much better. But eventually, in spite of all, although the clovers were not good, the ryegrass came away well.

The strike of short-rotation ryegrass was quite good and a lot of valuable feed was available at a time when it was most needed, just after calving. The summer of 1952 was dry, although not a drought. It was dry enough, however, to cry "Finis" to the short-rotation and the following spring it was obvious that practically no short-rotation ryegrass had survived. The clover, however, came away strongly and by the following autumn the paddock was clover dominant. This has been the pattern in several subsequent sowings. At this time it appeared that short-rotation ryegrass could not stand dry summers on light soil and also that the pedigree strains of white clover were so strong in growth that they were apt to choke the plants surviving or subsequent seedlings, so there was nothing to do but topsow with perennial ryegrass and carry on pasture renovation by cropping turnips in the spring and sowing and oversowing grass in the autumn.

It was thought at the time that the farm carried too much paspalum, which was summer dominant in nearly all paddocks and that as a strong paspalum pasture threw little or no early winter growth and indeed retarded the ryegrass, it would be better to have some paddocks paspalum free. So after a prolonged argument with the local Instructor in Agriculture, Mr A. V. Allo, in which he took the view that paspalum was a necessity in all Bay of Plenty pastures, it was decided to dispense with paspalum in some future mixtures and in the spring of 1951, the Pump Paddock carried a very heavy crop of Purple Top Mammoth and Hardy Green Globe soft turnips and was sown down in the autumn after discing with 20lb. of perennial ryegrass, 10lb. of short-rotation ryegrass, 5lb. of cocksfoot, 4lb. of red clover, and 3lb. of white clover. The following autumn this was white clover dominant and giving bad bloat, so it was topsown with a heavy mixture of 10lb. of perennial ryegrass and 5lb. of short-rotation ryegrass. This was repeated in the following autumn and now the

ratio is about 40 white clover, 35 perennial ryegrass, 25 short-rotation ryegrass.

Whether it is imagination or not, it seems that after short-rotation ryegrass has been in a pasture for a number of years, it is very difficult to distinguish between the ryegrass species and it is possible that considerable crossing has been going on.

In the spring of 1952 the night paddock, so called because of its pre-war use in this manner, and the Knob, a small paddock consisting of an acre surrounded by small gullies, were ploughed and sown with 11b. to the acre of Hardy Green Globe soft turnips, followed in the autumn by pasture sowing. Both these paddocks were very fertile, but the subsequent growth pattern was the same as that of the others and repeated topsowings were required in the autumns of 1954 and 1956. This pasture also gave bloat.

It should perhaps be explained here that for several reasons no hay is made on my farm. After the loss of 7 crops in succession, a firm oath was sworn that no more hay would be made. This was broken two years later when an anticyclone stretched from Tasmania to Fiji and a crop of hay was cut from Walls Paddock, but the hoodoo was not buried and from the blue sky fell several days' rain and a black, sodden mass was once again swept from the paddock. Apart from this, it was considered that after a hay crop, the aftermath in a dry season was negligible and also that, with a buckrake, silage making is both easier and cheaper. This decision was perhaps unfortunate from the short-rotation ryegrass angle, because there is no better way of getting short-rotation ryegrass into a pasture than by feeding the seed in hay.

After the night paddock had gone the same way as the others, a lot of deep thought was indulged in.

Was paspalum necessary, as the Instructor had thought? Under the law of averages, Instructors must be right sometimes. An examination of the parts of the paddocks where the paspalum had regenerated showed that there were more ryegrass plants than in the other portions. So that when the Big Triangle was sown down in the spring of 1953 with 11b. to the acre of New Zealand Green Globe, 61b. of paspalum was included. This paddock has not needed oversowing and a lot of short-rotation ryegrass and perennial ryegrass has persisted. There has been a little bloat here, but not bad.

At this time soil tests taken in various paddocks showed the top land to be fertile and in good heart and the sandy flats the reverse. With this guide, topsowing was now attempted, and in

the autumn the Cattle Stop was topsown with 10lb. of perennial ryegrass, 51b. of short-rotation ryegrass and 1lb. of white clover and the Sand Bank and Windmill with 61b. of perennial ryegrass and 31b. of cocksfoot. The first was a success and the last two were failures, for until the fertility level of the sandy flats could be built up, they would not carry a good pasture. Heavy dressings of 2cwt. of muriate of potash per acre resulted in a marked clover response. Very little ryegrass is growing even now on these pastures, but if the heavy clover growth persists, they will again be oversown with perennial and short-rotation ryegrass. Although heavy clover feed is eaten by the cows here, there has been literally no bloat. The Cattle Stop has done well for 4 years and is now due for reseeding this autumn.

In the autumn of 1954 a large sowing programme was carried out. The Big Triangle was disced after the turnips had been fed out and was sown with 181b. of perennial ryegrass, 91b. of short-rotation ryegrass, 81b. of cocksfoot, and 31b. of white clover. This was a success and with a good take of paspalum a good balance of grasses and clover was obtained. The Pump Paddock was resown, also the Road Paddocks. These last two had not been ploughed for at least 30 years and had evolved out of sodbound paspalum. The oversowing was a success and there is still a well-balanced sward. The following year the Orchard and the Shed were ploughed and sown in New Zealand Green Globe turnips and 61b. of paspalum seed.

In the autumn the Teachers Paddock, which was bad with tall fescue, was deep ploughed and sown with Italian ryegrass, while the Orchard and the Shed paddocks were disced and sown with the same mixture as had been used on the Big Triangle. An old lucerne stand in the Lucerne and Blue Gum paddocks was heavily disced and sown with 101b. of perennial ryegrass, 91b. of short-rotation ryegrass, 51b. of cocksfoot, and 31b. of white clover. This paddock had hardly any paspalum and went clover dominant and has proved a real bloat headache and the two subsequent autumns have been partly occupied by topsowing and undersowing with ryegrasses in an endeavour to check the clover and so ease the bloat situation. Heavy seedings were used the first year (121b. of perennial ryegrass and 81b. of short-rotation ryegrass, followed by undersowing the following year with 61b. of perennial ryegrass and 41b. of short-rotation ryegrass). The latter, especially, was a good take and the sward at present carries a large amount of short-rotation and perennial ryegrass.

In 1954 the Upper and Lower House paddocks were topsown. A system of topsowing had by this time become standard. I had by this time found out that one should not topsow while there

was strong competition growth or while a pasture was carrying any feed and that the sowing should be done on a pouring wet day, when any self-respecting dairy farmer should be in the house with a fire going and a good book. This sowing in the Upper and Lower House paddocks was most successful. The seeding was 10lb. of perennial ryegrass plus 6lb. of short-rotation ryegrass. These paddocks, like the Road Paddock, had not been ploughed for many years and it is a matter of note that these old pastures topsown are by far the best paddocks on the farm.

Walls Paddock was once again oversown and the Plum Tree, a paddock which had been an old pig paddock, was ploughed and sown with 20lb. of perennial ryegrass, 10lb. of short-rotation ryegrass, 8lb. of cocksfoot, and 3lb. of white clover.

It had become apparent by now that the pastures resulting either from oversowing and after ploughing were following definite patterns. Grazing treatment was the same, 24 hours on each paddock and on to the next longest grass, and in the winter 80 per cent. of the farm in autumn-sown pasture fed in rations with the electric fence. Paddocks ploughed and sown without paspalum were the worst, being clover dominant and requiring repeated topsowing with ryegrasses to preserve a grass:clover balance. Paddocks ploughed and sown with paspalum were better, but not as good as the third type, the established pastures, thick, but not sodbound with paspalum, which were oversown with perennial ryegrass and short-rotation ryegrass. These were and are good, carrying heavy silage crops and well-balanced grazing, with no bloat. (The clover in these is not pedigree and has not been sown by me.)

Subsequent sowings after this pattern were carried out in the 1955-56 and 1956-57 seasons with exactly the same results and following the same pattern.

What is the reason? Well, there may be several.

To take the differences between the way these paddocks have been handled:

One lot has been ploughed; the other not. Ploughing undoubtedly loses consolidation without which ryegrass and especially short-rotation ryegrass cannot prosper. This could be part of the answer, but there must be more. Otherwise the ryegrass would persist round gateways and troughs, which it does not.

With the loss of consolidation it was thought likely that grass-grub infestation might have increased. An examination has shown varying concentrations from 2 to 7 grubs per square foot,

averaging about 3, but the concentration in the ploughed paddocks was no worse than in the others. Grass-grubs love short-rotation ryegrass roots and perhaps they are more accessible in the less consolidated areas. In any case, to test the grass-grub theory, it is intended to topdress several strips with D.D.T. superphosphate across several paddocks this spring. The pastures sown earlier on this farm carried no short-rotation ryegrass but perennial ryegrass and cocksfoot and white clover were sown. These paddocks still carry a large proportion of perennial ryegrass. Perhaps the clover used then was not such a terrific grower as the pedigree strains which have been used in the last few years. This seems almost certainly part of the answer. When the Teachers Paddock was ploughed from sodbound paspalum and tall fescue in the autumn of 1955, it was sown with 32lb. of Italian ryegrass per acre and followed with a further ploughing in the spring to kill the tall fescue, which was heavy, especially on the two sides where a tall barberry hedge grew. Then 1lb. of New Zealand Green Globe soft turnips and 6lb. of paspalum per acre were sown, a good crop of turnips was obtained, and a thick aftermath of paspalum. This was disced and sown with 18lb. of perennial ryegrass, 9lb. of short-rotation ryegrass, 6lb. of cocksfoot, and 3lb. of white clover. Along the hedge sides where the cows camp at night, where the soil is over fertile from repeated droppings, 2 bushels of prairie grass to the acre was disced in, as it has been found that all other grasses tend to become rank on these places. Prairie grass, however, is eaten readily. This treatment turned out to be a complete success and has been repeated in other paddocks under similar conditions.

A good strike of ryegrass and clover was obtained. As usual it was fed early and lightly, but although not dominant to the extent of excluding the ryegrasses, the clover was too strong by August 1956 and was giving bloat. However, half the paddock was infested with land cress. The directors of the Tauranga Dairy Co., in their wisdom, hold very strong views on their suppliers sending in cress tainted cream and have, in their search for premium butter, imposed a penalty of 6d. a lb. below first grade cream. So the infested half of the paddock was sprayed with M.C.P. The cress was killed and the clover checked and the short-rotation ryegrass and perennial ryegrass grew more on this half than the other. The paspalum also grew more and in March this half was topped and raked. Rain fell on 8 March (4.96in. followed by .65in. on the next two days). The ryegrasses had seeded prior to topping and a dense growth of ryegrass seedlings covered this part of the paddock. There were fewer seedlings on

the other half. More warm rain fell, bringing the March total to 12in., and the clover grew enormously and smothered the young ryegrass. On 25 April, 93 cows were fed for two days. The ryegrass recovered, but the weather continued mild and favoured clover growth and by the middle of May the clover was once more dominant and a decision had to be made: The paddock or the cows? The cows won and this paddock was not fed off again owing to the fear that frosts would prevent recovery of growth which would lead to a shortage of feed in August and September.

To summarise:

(a) The weather in the Tauranga district makes it essential that 2/3 of total production must be before the New Year. To do this, cows must calve early.

(b) Early calving cows must be fed grass in addition to hay and silage.

(c) The best grasses for winter growth are the ryegrasses, short-rotation ryegrass for autumn and winter and perennial ryegrass for winter and early spring.

(d) Short-rotation ryegrass will not persist under dry conditions and will have to be reseeded in some way. Too much should not be used; otherwise thin patches will adversely affect production of a paddock.

(e) Paspalum will help to hold other grasses.

(f) Haymaking may be the best way to reseed, but undersowing and topsowing can be very useful and fits into farm routine very satisfactorily.

It has been recommended that short-rotation ryegrass should be used in special-purpose pastures, but the emphasis should be placed on the type of special purpose required.

For this type of country, what better sort of special-purpose pasture could we have than a ryegrass, paspalum, and white clover paddock? Which, incidentally, takes one back many years when it was said that this was the highest producing pasture in the world.

That is my ambition on my own farm, to get pastures producing paspalum in the summer, short-rotation ryegrass and clover in the autumn, with perennial ryegrass later on and persisting with clover into the early summer. Then I will feel that I have really got somewhere.

DISCUSSION

Q. Can Mr Titterton tell us whether it is possible to hold paspalum at the desirable proportion he has mentioned in his paper?

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- A. On swamp country, it is difficult to prevent paspalum from becoming dominant, but on the tops this can be done quite easily so long as the pasture is kept in proper control by topping.
- Q. Has D.D.T. been used by farmers in your district and have you yourself used it?
- A. I have had no personal experience but a lot have used it in the neighbourhood and are quite pleased with the result.
- Q. Would Mr Titterton comment on sod seeding as against broadcasting and oversowing.
- A. A lot depends on the weather. Sod seeding does not depend as much on weather as does oversowing and is therefore more useful to the farmer. In my experience, oversowing is only satisfactory if done in the rain when all self-respecting dairy farmers should be in beside the fire with a good book.
- Q. In the Manawatu we have found that frost does have some effect on the amount of short-rotation ryegrass in the pasture. What has been your experience in the Bay of Plenty?
- A. Frost has sometimes checked the growth of short-rotation ryegrass but it is the exception rather than the rule. We have found that we get good growth nearly all the year round.
- Q. Why was it that Mr Titterton did not use prairie grass in his pasture mixture? Would it not have been better to have used prairie grass on all good areas rather than just along the high fertility hedge lines?
- A. Prairie grass was still being used, but because it shaded the clovers, it was not recommended in large quantities. Quite often a paddock with much prairie grass when grazed by cattle was not nearly as good as it first appeared. In a very short time, areas would be grazed and left very open due to the tall nature of the grass. However, the value of it seemed to be in sowing at two bushels to the acre along the high fertility strips which would otherwise grow only weeds and very little else.