IMPORTANCE OF SPELLING IN PASTURE PRODUCTION

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In the 20 years between 1919 and 1939 a Wairarapa hill-country farmer was able to increase the carrying capacity of a 3300-acre hill-country farm from some 4800 sheep wintered in 1919 to some 8000 carried through the winter on the property in 1939, and this without the aid of fertilisers or the improvement of the pastures by oversowing with clovers. This amazing improvement in carrying capacity was effected by rotational spelling of the pastures and mobstocking with sheep. The development of the carrying capacity on this farm through pasture spelling was the subject of an article in "The Journal of Agriculture" for September, 1939. (1) About the same time that this system of pasture spelling and mobstocking was being developed on typical Wairarapa hill country a few fat lamb farmers tried out the idea of systematic spelling of pastures to encourage growth, particularly of the better pasture species. Pastures were spelled in turn by running the ewes through the autumn and winter as one mob and through the spring and summer the ewes and lambs in several mobs were moved round the pastures. The striking results achieved by this method of pasture management by a farmer near Marton who was able to increase his carrying capacity from some four ewes to the acre to as high as nine ewes per acre were also reported in "The Journal of Agriculture" for May, 1934. (2) New Zealand's dairy farmers have for a long time practised' systematic spelling of pastures with quick grazing off by large mobs of dairy cattle. The layout and subdivision of the high-producing, all-grass dairy farm has been designed for this type of pasture management. Compared with the fat lamb producer who until quite recently practised set stocking and almost continuous grazing of his pastures, the average dairy farmer farming similar land has been able to produce from his pastures something like double

the dry matter per acre of land -under grass, He has been able to graze. up to a, dairy. cow per acre or the equivalent of 10 ewes, compared with the 4 to 5 ewes of the best fat lamb farmers on the' same soils in the same districts',

SIMPLE, MARTON PASTURE SPELLING TRIAL

To study the effect of spelling for various periods on pasture production and pasture composition and to see if some worthwhile data on this subject could be obtained which could be used 'in putting more clearly before farmers,, 'particularly- hill country farmers, the advantages of spelling pastures, a simple trial was laid down on the Marton Experimental Area in the spring of 1949. It must be made quite clear at the outset that this trial was not concerned in any way with the stock angle. It was designed simply to find out. the effect on dry matter production and pasture composition of regular spelling for different weekly periods throughout the year.

An area of'old pasture composed of perennial 'ryegrass, cocksfoot, 'browntop, sweet vernal, Yorkshire fog, with a little white clover, and flat weeds was laid off as a mowing trial in- six replications of 4 plots. Plot 1 was mown once a week throughout the, four years of the trial. Plot 2 was mown every two weeks, plot 3 every three weeks, and plot 4 every six weeks.. In other words plot 1 was cut and the grass weighed 52 times in the year, plot, 2 was cut 26 times, plot 3 was cut 12 times, and plot 4 was cut only eight times in the year.

In addition to the'green weights from each cut, the dry matter for each cut was calculated and 'the samples were used for pasture species analysis throughout the trial.

The area used for the trial had not been topdressed for several years'and had been grazed irregularly with sheep.- All plots were dressed at the commencement of the, trial with 3cwt. -per acre of superphosphate and -1 ton of lime and thereafter annually with 3cwt. of superphosphate plus 5cwt. of lime.

RESULTS OF LENGTH OF SPELLING ON PASTURE COMPOSITION

The effect of the length of spell on the composition of the pasture was studied in the field and by means of continuous herbage dissections of the cut material from each treatment.

Field observations record that with the longer spells the sward showed more bare ground, an increase in weed content, and in the case of the six week spelled areas an increase in Yorkshire fog. The trends in this direction are shown by the proportions in which the main grasses and clovers contributed to the total production from each of the treatments as recorded in the second and third years of the trial.

COMMENTS ON TABLE I

The remarkable increases in dry matter yields from a relatively low production pasture which have resulted from the simple process of giving the pasture plants a chance to grow and produce leaf by spelling are surely well worth further study, particularly by the sheep farmer who may be considering ways and means of increasing production from his pastures.

The Marton Experimental Area has been used for the past 20 years or more' for trial work on pastures in which pasture production resulting from manurial treatments, varying pasture species mixtures, and varying grazing management has been measured by the mowing or mowing and grazing technique. An examination of the results of manurial trials, pasture species trials, and the many other pasture trials at Marton shows. that in no case have the results of differential treatments given differences in annual dry matter production of the magnitude of those recorded for this pasture spelling, trial. Taking manurial trials as an example, 'the best results so far recorded for the most efficient manurial treatment tried, compared with no manure, over a series of consecutive seasons have been an increase in dry matter for the manurial treatment of up to 25 per cent. per annum.

TABLE II

Yields of Herbage Dissection Analysis in lb. dry matter per acre for Main Pasture Species.

PERCENTAGE OF DRY MATTER FOR PASTURE SPECIES.

PERIOD	TREATMENT	Per. Rye.	Brown-top.	York-shire fog.	Sweet vernal.	White clover.	Other species.	Total dry matter
3.5.51/	CUT							
14.5.52	one weekly	14%	10%	4'0%	—%	22%	14%	2348
,,	two weekly	16	9	4 4	14	14	3	3507
,,	three weekly	30	9	20	10	18	13	43'23
,,	six weekly	17	8	23	8	17	27	6621
15.5.52/								
27.5.53	one weekly	24%	4%	12%	14%	15%	31%	3890
,,	two weekly	20	3	8	23	25	21	4650
,,	three weekly	22	3	10	17	20	28	5320
,,	six weekly	22	3	24	6	20	25	6742

RESULTS

TABLE 1

Dry matter per acre calculated from green weights cut from the plots.

Period.	Plot 1 Cut wkly. lb. dry matter per ac.	Plot 2 Cut 2-wkly. lb. dry matter per ac.	Plot 3 Cut 3-wkly. lb. dry matter per ac.	Plot 4 Cut 6-wkly. lb. dry matter per ac.
20.8.49-14.12.49	1453	2233	2696	4020
15.12.49-8.3.50	677	969	1252	1528
9.3.50-31.5.50	676	917	889	1010
1.6.50-23.8.50	148	147	183	196
1st Year	2954	4266	5020	6754
24.8.50-15.11.50	1412	1893	2021	3210
16.11.50-7.2.51	1052	1294	1407	1637
8.2.51-2.5.51	822	960	1266	1389
3.5.51-5.9.51	88	118	213	401
2nd Year	3374	4265	4907	6637
6.9.51-28.11.51	1300	1830	2370	2960
29.11.51-20.2.52	860	1290	1770	2370
21.2.52-14.5.52	100	270	370	590
15.5.52-6.8.52	130	360	350	540
3rd Year	2390	3750	4860	6460
7.8.52-29.10.52	870	1200	1460	2150
30.10.52-21.1.53	1470	1730	1820	1890
22.1.53-15.4.53	1350	1480	1710	2290
16.4.53-2'7.5.53	170	160	260	280
4th Year	3860	4570	5250	6610
*42 weeks				
Grand Totals	12578	16851	20037	26461

*Breakdown of drainage made mowing impossible for last 12 weeks of year.

COMMENT ON TABLE. II

This table shows that the herbage species analysis of the cuts from the various plots confirms the trend to a little more ryegrass in the weekly cut plots, whereas there was a -tendency for more vigorous white clover in the longer spelled areas. It is significant that on this soil type, which tends. very definitely to browntop under continuous grazing, there has been a uniform reduction in this species under the spelling

treatment. Yorkshire fog, as was to be expected, shows- a marked variation from season to season, while the longer spell does not appear to favour sweet vernal. Any change in composition has not been really significant in respect to the total production of dry matter in the form of either perennial ryegrass or white clover. In the year May, 1952, to April, 1953, the yield of- perennial ryegrass from the weekly cut areas was 9601b. per acre and 14601b. from the six-weekly cut areas, while 'the yield of white clover was 570lb. and 1380lb. respectively out of a total yield of 3890lb. for the weekly spelled and 67201b. of dry matter for the six-weekly spelled areas.

SIGNIFICANCE OF TRIAL

This trial then shows that very considerable increases in production of dry matter from pastures can be effected through planned spelling. The results account in some part for the remarkable increases in carrying capacity which have been demonstrated to be possible by practical farmers through adopting a system of pasture grazing management based on pasture spelling and the relatively quick utilisation through the grazing animal of the growth produced during the spells.

The trial results do not appear to illustrate fully what production increases are possible from grazed pastures,, in that animals were not used to consume the grass and return the residues to the land as is the case under field grazing. A new trial on better pasture and making use of the grazing animal to utilise the feed produced as a result of varying periods of spelling is now 'under way at Marton Area and should provide some further useful data on this subject of spelling of pastures. The trial results are, however, considered to be of sufficient significance to warrant very serious thought by grassland farmers and grassland workers when' they are considering the potential improvement which can be effected. in the productive capacity of our grasslands. The trial results have and are being used in this connection, particularly in discussing the prevention of deterioration and the possibility of increasing production on our many millions of acres of unploughable hill country. There is already a very decided move on the part of North, Island hill country farmers to abandon set stocking and more or less continuous grazing in favour of spelling of pas-

tures and mob stocking. While topdressing and oversowing are definitely playing an important part in hill country improvement, there is no doubt that where these practices are being combined with pasture spelling and mob stocking the results in pasture improvement and better winter carrying capacity are very definitely better than what. can be achieved with topdressing and oversowing alone.

REFERENCES

1. "Improvement of Hill Country Pasture," by N. Lamont, N.Z. Journal of Agriculture, September, 1939.
2. "Diversification as a Means of Making Dairying Safer and More Profitable," by W. J. McCulloch and R. P, Connell, N.Z. Journal of Agriculture, May, 1934.

DISCUSSION

Q. Could the speaker indicate methods that might be used to economise drastically the low supplies of ryegrass seed?

A. (Leitch): Serious consideration of the question is needed if we are going to increase production. Any area that shows promise of seed being available should be grazed until seed heads appear. and then shut up. We have been saying we are not grazing pastures enough. This season quite a number are starting to wonder what they are going to do with the sheep numbers they have. Those who have saved surplus pasture before increasing their stock are all right, but others may be in difficulties. It is a question of whether we can adopt the policy of self-interest and to hell with the other fellow or whether we can take the interests of the country as a whole and produce seed. Without seed supplies we are going to be in a serious position. Saving of seed does not necessarily mean reduction in carrying capacity; only a little more thought in management. The Blackmore coulters could be used to introduce seed without cultivation. It is a very quick way of establishing a pasture under the present set-up.

Q. HOW far are you able to graze cocksfoot without harming the lucerne, presuming lucerne does not die back as it does in England ?

A. (Leitch) : Winter grazing of cocksfoot during the dormant period of lucerne does give a longer period of use of the cocksfoot-lucerne combination. How you handle it is the crux of the matter.

Q. What are the relative values of prairie grass, phalaris, and short-rotation ryegrass for winter-producing dairy cows ?

A. (Hamblyn) : In North Taranaki short-rotation ryegrass and prairie grass have been compared on a winter milk producing dairy farm and the results were in favour of short-rotation, but not much.

Prof. Calder: At Lincoln we have found that a phalaris pasture will fit into a town milk supply dairy herd. We sowed

phalaris at 61b. per acre in a mixture for a pasture now seven or eight years old. We have learned how to handle it. One of our early troubles was losing the white clover. By controlling the growth of the phalaris we kept the white clover in the mixture. The practice is to graze in spring and summer and about the beginning of March close it up. We get two months' growth before winter (March and April), by which time it is 8 to 10in. high and the most beautiful looking pasture for a dairy herd anyone could see. It stands up to frosts in May, June, and July. Anytime during that period the dairy herd can break-feed it. Its most important attribute is that when short-rotation pastures are poached in wet weather we can put the herd on to phalaris, which stands well.

Holmes: At Invermay we had a few fatalities of ewes grazed on ahalaris alone. To a certain extent we had lost the white clover. Ewes and lambs ate everything except the white clover. Several took phalaris staggers, which proved fatal to some. It is a dangerous feed for sheep in a dry spring.

Q. Would the addition of prairie grass to a mixture help to control bloat?

A. (Melville): Any grass which grows well during bloat time is a good one. Any measure which can dilute the clover content is a good one.

Q. Have there been any experiments to try to relate the solids-not-fat in milk to pasture species?

A. (Griffiths): There has been trouble in England with solids-not-fat in early spring with herds on new grass. Nutritional chemists found that by giving a ration each day of reasonably good hay the position was improved. They seemed to think the problem was tied up with loss of fibre ,in good new grass.-

Q. I have had experience of eczema of dairy cows in early spring on the Ruawai Flats when ryegrass is dominant and wonder if the ryegrass has anything to do with it? Cattle lose the skin from their udders. teats. and ears. There is swelling of the face and practically the whole body. Finally the hide practically came off.

A. (Dr. Filmer) : We have had no -evidence of facial eczema of cattle or sheep in spring. Odd instances of the trouble referred to have been brought to our notice, but with the exception of St. John's wort we have not been able to isolate the factor causing it.