

A.

THE YIELDS OF DRY MATTER FROM PURE SOWINGS OF SOME PASTURE PLANTS (CUT WITH A LAWN MOWER) OVER A PERIOD OF THREE YEARS.

The trial from which these results were obtained was sown in February 1930. Plots of eighteen kinds of grasses and clovers were sown in triplicate, each plot being 11 yards by 18 inches. The plots were cut with a lawn mower at different periods when the growth was  $1\frac{1}{2}$ " - 3" high. Air dry weights were secured. It will be noticed from the graph that nine cuts were taken in the first year, four cuts in the second year, and three cuts in the third year. In only two instances, in the spring of the first season, was the interval between successive cuttings less than one month. The plots were not grazed except for one short period when a mob of sheep was put on for twenty-four hours to get some information on the palatability of the different species. Superphosphate at the rate of  $1\frac{1}{2}$  cwt. per acre was applied in the winters of 1931 and 1932.

It is admitted that results of the trial are of limited value owing to the fact that no grazing was permitted, but they are sufficiently outstanding to warrant consideration.

The yields from eight species are given in graph form. The produce of each year is divided into 'spring' (September to December), and 'autumn' (January to May) periods. The graph shows the total actual yield per plot (height of each column) and the estimated weight of weeds as the top unshaded part of each column,

A study of the results as they appear in graph form illustrates the following :--

1. The marked decrease in yields in the second and third years. This may in part be due to the effects of season,

Cocksfoot.. (a) Pure sowings of Cocksfoot yield nine-tenths as much as Perennial Ryegrass in the first year.

(b) Cocksfoot outyields Perennial Ryegrass by 40% in the first autumn,

(c) By 50% in the second spring

(d) And by 40% in the second autumn.

(e) Ryegrass outyields Cocksfoot by 30% in the third spring,

(f) And by 5% in the third autumn,

III. Red Clover (1) Red Clover outyields Perennial Ryegrass by 100% in the first autumn.

(2) By 80% in the second spring

(3) By 100% in the second autumn.

(4) By 30% in the third spring,

(5) and by 5% in the third autumn,

(6) Is the highest yielding species in the third spring..

IV. White Clover.

(1) This is the only species to give increased yields in the second spring.

(2) It is the highest yielding plot in the third season, partly owing to the large proportion of weeds.

(3) It is the highest yielding plot and the highest yielding species in the 2nd spring,

(4) It is the second highest yielding species in the 3rd autumn - being second to Chewings Fescue. Compare the yield of weeds in the clover and Fescue plot at this period.

- V. Dogstail (1) Produces a **high** yield in first spring (largely owing to a prolific development of seed heads in **November**.  
(2) Gives low yields in first autumn,  
(3) **second** season, and third spring,  
(3) Equal to ryegrass in third autumn,
- VI. Chewings Fescue.  
(1) It is a low yielder in the first spring.  
(2) Yields 5% less than Perennial Rye in the first autumn.  
(3) Outyields Ryegrass by 5% in the second spring.  
(4) By 100% in the second autumn.  
(5) By 30% in the the third autumn  
(6) And by 30% in the third spring.
- VII. Browntop. (1) Is a low yielder in the first season.  
(2) Out yields Perennial Rye by 15% in the second spring.  
(3) And by 50% in the second autumn.  
(4) Ryegrass outyields it by 20% in the third spring.  
(5) Browntop outyields Perennial Rye by 20% in the third autumn
- VIII, Weeds. (1) The increased proportion of weeds contributing to the dry weight in the second and third year,  
(2) The low proportion of weeds in the Chewings fescus and browntop plots in the second and third years,  
(3) The high proportion of weeds in the Italian Ryegrass plot in the second autumn and third season.  
(4) The low proportion of weeds in the Perennial Ryegrass plot in the second and third season.  
(5) The highproportion of weeds in the White clover plot in the third season.

The second graph shows the results of a trial conducted on similar lines with eleven strains of Perennial Ryegrass; The estimated proportion of weeds is again represented by the unshaded parts at the top of the columns which represents the total weight per plot.

The following points are illustrated by the graph.

I. The marked decrease in yield in the second season and to a less extent in the third season as noticed in the first trial.

II. Increasing proportion of weeds in second and third seasons.

III. High total yields caused by high proportion of weeds in the temporary strains (8, 10, and 11) and low yields of ryegrass in the second and third seasons from these strains..

IV. The fluctuating nature of the yields of the true Perennial strains over the three years, e.g.

Plot 3 yield high in 1st and 2nd years but low in 3rd..

Plot 6 yield high in 1st, low in 2nd, and high in 3rd.

Plot 7 yield low in 1st and 2nd year, and high in 3rd.

Taking the results of these two trials together and setting on one side the apparently high producing chewings

and browntop owing to their twitchy habits, and their low palatability we may conclude that the only plants which are worthy of inclusion in permanent pastures on average Canterbury wheat, land, are Perennial Ryegrass, Cocksfoot, Red Clover and White Clover.

B.

THE EFFECT OF THE TIME OF SOWING A MIXTURE ON THE ESTABLISHMENT OF RED CLOVER AND OF COCKSFOOT.

'A-mixture consisting of Perennial Ryegrass 20 lbs. Cocksfoot 8 lbs, Red Clover 4 lbs, was divided into twelve parts. One part was sown about the beginning of each month starting in October 1930 until September 1931. In each sowing Perennial Ryegrass early dominated the sward, but in the October and November sowings even the aggressive plant was considerably suppressed by weeds (Shepherd's Purse, Spurry, Cats ear, Sorrel, etc.) Weeds were not prominent on any of the other sowings, and these up till the April one, presented the appearance of a pure dense sward of Ryegrass. The winter sowings did not prove very satisfactory.

The plots were cut in March, 1931 to clear off the weed growth, grazed lightly during the winter and early spring and shut up for hay in early November.

The following table shows the estimated percentage of Red Clover in the hay in December 1931. The October, November and December sowings gave almost pure Ryegrass hay. The lower yields of hay from the October, November, and December sowings is probably a result of the increased grazing obtained from these plots.

TABLE SHOWING THE EFFECT OF DATE OF SOWING A MIXTURE ON THE ESTABLISHMENT OF RED CLOVER AND COCKSFOOT.

DATE OF SOWING	YIELD OF HAY Lbs. PER PLOT	ESTIMATED PER- CENTAGE OF RED CLOVER IN HAY- DECEMBER, 1931	PERCENTAGE COVER MARCH 1933	
			RED CLOVER	COCKSFOOT
1/10/30	6.6	80	32	34
1/11/30	11.5	80	34	32
3/12/30	11.4	87	35	12
4/ 1/31	13.9	5	5	20
1/ 2/31	13.2	5	11	18
4/ 3/31	8.8	trace	5	5
2/ 4/31	6.0	trace	1	6
1/ 5/31	5.0	trace	1	7

After this the plots were grazed lightly during the autumn, winter and spring of 1932, during which time Red Clover was still prominent in the October, November and December sowings.

In March, 1933, the percentage cover of Red Clover was measured by means of grid quadrants, and it is seen from the table that it still plays an important part in the herbage of the October, November, and December sowings, while in the later sowings Red Clover is much less in evidence.

Towards the end of 1932 and in the early parts of 1933 when the ryegrass was beginning to thin out during the dry period Cocksfoot began to show up for the first time, and here again it was noticed that the October and November sowings contained the highest proportion of Cocksfoot followed closely by

the January and February sowings. The percentage cover was measured by means of the grid quadrants and the results are shown in the table.

The result of this experiment has an important bearing on the establishment of mixtures in Canterbury. Red Clover and Cocksfoot, which we have seen are important pasture plants, are frequently sown in mixtures with Ryegrass, but they do not appear in the proportion expected, particularly Red Clover, and to a lesser extent, Cocksfoot.

It would appear from the results of this trial that autumn sowing is at least one of the factors responsible for this condition,

Pure sowings of Red Clover and Cocksfoot can be established quite satisfactorily in February and March under average conditions, but when sown along with Perennial Rye this plant aggressive in its early life, probably suppresses the slower growing Red Clover and Cocksfoot so that they are not sufficiently well grown to withstand the winter.

The results apply only to one season, and their value is therefore restricted. The trial, however, is being repeated and will be continued over a number of years so that the important effect of season can be considered.

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