

THE USE OF SHORT-ROTATION RYEGRASS AT LINCOLN COLLEGE

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Apart from pedigree white clover no pasture species has had more impact on the College farm than short-rotation ryegrass. Equally spectacular has been the decreasing dependence on swards based on perennial ryegrass.

These changes are not typical of Canterbury farming, although they can be paralleled on individual farms.

Before details of the changes are given it is necessary to give ~~some background of the setting in which they have occurred.~~

The College rainfall averages 26in., varying between 15 and 40in. Due to drying winds in summer evaporation is high, averaging 37 inches, so that there is normally a water deficit for three to four months.

The soils of the plains are about half and half light, droughty soils and good, medium wheat land with a small proportion of heavy, moisture-retentive soils mostly devoted to town milk supply.

The College farm contains soils of each type, but not in a typical proportion, there being only 17 per cent. of light soils and 28 per cent. of heavy soils.

Of the College farm of 1000 acres about 360 acres are devoted to crop, 90 acres to lucerne, and 550 acres to pasture. Of the pasture area 100 to 200 acres may be cut for seed each year.

Stocking is by dairy cows and stud sheep and for the class of land is not particularly heavy.

The bogy of summer drought has tended to prevent full utilisation. Surplus growth is dealt with by taking seed crops of grass and clover. Lenient stocking, rotational grazing, and opportunity to reseed are the main features of utilisation and are important factors in the success of short-rotation ryegrass on this farm.

The fertility of the farm is high, there is a long record of use of fertiliser and lime, and the standard of pasture establishment is of the highest order.

The use of short-rotation ryegrass since it was first introduced in 1941 is shown in Table 1.

Table 1—Areas of Short-rotation Ryegrass at Lincoln College.

	Seed	Acres		Total
		No per rye	+ per rye	
1942	29	—	—	29
1947	94	30	15	139
1952	1 7 6	40	15	231
1957	76	137	115	328

At first most of the areas were sown with seed production in mind. Recently emphasis has been on mixtures for grazing. Many such mixtures are sown without perennial ryegrass. The increase in area from 29 acres to 328 acres has been fairly steady with one period of vacillation. From 1947 to 1950 were three dry years and on the medium land of low fertility short-rotation ryegrass pastures were subject to heavy mortality. Consideration was given to a change of policy back to perennial ryegrass; However, the regeneration of short-rotation ryegrass with the return of some moisture restored faith in the policy. Projecting forward to 1960 one would expect the area of dominantly short-rotation ryegrass pasture to stabilise at about 400 acres.

The class of soil has a distinct influence on its use, as is shown in Table 2.

Table 2—Use of Short-rotation Ryegrass on Different Soils.

	Acres		
	Pasture Area	S.R.	%
Light	125	23	18%
Medium	272	199	73%
Heavy	153	106	69%
	550	328	60%

Use on Heavy Land

Most of the pastures sown on the heavy land have been mixtures for grazing, mainly by dairy cows. The mixtures used have been two:

	A	or	B
	lb.		lb.
Short-rotation	15		15
Perennial	5		—
Timothy	5		5
Red clover	3		—
White clover	2		2
	30		22

MIXTURE A has been very successful, the dominants being successively short-rotation ryegrass, red clover, perennial ryegrass, and timothy after 4 years.

Initial production with this mixture is high; red clover is of value for two summers and seasonal spread is reasonably good and persistence and bearing surface are given by the perennial ryegrass and timothy.

The weaknesses of this mixture have been two: the incidence of bloat with red clover and lack of persistence of short-rotation ryegrass.

MIXTURE B has been an improvement from the point of view of these two disadvantages and is the recommended mixture. However, it has two disadvantages: a tendency to open up in dry weather with a consequent ingress of barley grass and a poor bearing surface in winter.

Seasonal production from such a mixture in its seventh season is shown in Table 3.

Table 3—Seasonal Production S2 1955-56.

Season	Total	Short- Rotation	Lb. dry matter per acre			
			Timothy	White Clover	Other	
Winter	1184	716	274	141	53	
Spring	3548	1500	1108	670	270	
Summer	3306	320	1550	1316	120	
Autumn	1855	525	895	405	30	
Total	9893	306 1	3827	2532	473	

Total production at 9893lb. of dry matter is close to the average for 5 years (10,230lb.), but winter production was assisted by a mild winter. Summer production was maintained by sprinkler irrigation. Eleven irrigations totalling 24½in. were applied at a cost of £7 for the plant and £2 12s. per acre for labour.

The growth pattern of short-rotation ryegrass is well shown in Fig. 1: high winter and spring production with low summer and autumn production. Such a growth pattern is of inestimable value for town-milk supply. Consequently one finds Canterbury farms on similar land adopting this grass much as the College has done.

Some of the grazing pastures on the heavy land have been used exclusively for sheep; for example, SE 2/3; two fields of 7½ acres each sown in 19.52 with 20lb. of short-rotation ryegrass and 21b. of white clover, the stock carried in each of the two years 1954-1 956 being as follows:

March-May: 100 ewes for tugging.

June-July: spelled.

August-December: 250 2-tooth rams.

January-February: spelled.

This is an equivalent of 8 dry sheep per acre.

Grazing has been week about in each field. The summer spell permits reseeding and some autumn recovery. The winter spell avoids trampling damage and gives early spring growth. After 6 years this pasture is still a good sward.

The balance of 47 acres of pasture on heavy land is in special-purpose pastures of timothy and phalaris with only 16 acres in perennial ryegrass.

Use on Medium Land

On most farms swards are dominantly perennial ryegrass—white clover. Ryegrass seed may be taken in the first season and white clover in the second. As white clover is the more profitable crop, some farmers have changed to short-rotation ryegrass, as its more open sward favours white clover seed production. This has been the pattern on the College farm where 71 per cent. of such pastures are sown with short-rotation ryegrass and white clover.

In spite of seed production, valuable grazing is obtained, particularly in the critical periods of winter and early spring.

~~Bitter complaints are made by the supervisors of stud stock at~~ having to control the balance of the pastures sown in perennial ryegrass. These can be expected to be replaced as rapidly as possible with short-rotation ryegrass.

This feature has been noted by several farmers who have adopted the same policy. Once a farm has a high percentage of short-rotation ryegrass pastures, perennial ryegrass pastures become only a maintenance ration. This refers, of course, to the dry conditions of Canterbury where perennial ryegrass has a thin, wiry leaf.

Peristence of short-rotation ryegrass swards on this class of land has been good, but is favoured by the fertility and the management. A projected change to intensive sheep stocking with close grazing may require the inclusion of some perennial ryegrass as in mixture A and it is probably true that under more intensive stocking perennial ryegrass is more palatable.

Use on Light Land

Here the pastures are dominated by perennial ryegrass, cocksfoot, and subterranean clover. Short-rotation ryegrass behaves little better than an annual and the inclusion of even 5lb. in a mixture is of doubtful value, as it exerts an early smothering effect, then quickly disappears, leaving serious gaps. Some use is made of the plant for winter greenfeed. On pastures with subterranean clover as a dominant, surface cultivation is carried out in January and 10lb. of short-rotation ryegrass drilled in and fed off in July, August, and September.

Persistence of Short-Rotation Ryegrass

Persistence is less affected by the inherent characteristics of the plant than by the environment and the management.

The average length of life of 21 fields has been 5 to 6 years.

In many cases this could have been extended, the fields being ploughed as part of the rotation. One field sown in 1943 carries a good sward today, while on the dairy farm the grass can be classed as semi-permanent.

On the medium land an important feature of persistence is the germination of shed seed. This is encouraged by closing for seed or a late hay crop or by lenient summer grazing. The success of reseedling depends on soil fertility. Where fertility is high there is good regeneration on relatively light land even after a severe drought. Sod-seeding in extreme cases has had good results. Short-rotation ryegrass is prone to damage by porina and grass-grub. The use of D.D.T. superphosphate is important for persistence. Under grazing, short-rotation ryegrass has not the latitude of perennial ryegrass but demands careful management. It is encouraged by a winter spell, rotational grazing, and lenient stocking.

Where a farm has the fertility and moisture to encourage its persistence and the farmer is prepared to give it the careful management it requires, it tends to be used exclusively because of its palatability and season of growth. For the average farm, however, perhaps the greatest need is the production of a palatable perennial ryegrass, a project in hand at Grasslands Division.

DISCUSSION

- Q. Since short-rotation ryegrass and timothy do not stand winter trampling on the College dairy farm, what proportion of the farm is sown in other species which are suitable for winter use?
- A. Special purpose phalaris and mixtures containing perennial ryegrass and timothy are used for the purpose and represent about one third of the farm.
- Q. Has Mr Iversen noticed any difference among strains of short-rotation ryegrass in their persistency, especially during dry summer?
- A. The later strains have been more persistent at the College.
- Q. Can Mr Iversen give a guide to the extent to which reseedling is responsible for the persistence of short-rotation ryegrass at Lincoln?
- A. On heavy land reseedling is not a vital factor in persistency but on medium land it is. On medium land short-rotation ryegrass is probably no better than a biennial.