Regrowth of subterranean clover lines differing in plant morphology

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Cultivars for intensively-grazed pastures should possess the capacity for rapid regrowth. The present study aims to identify characteristics of sub clover important for regrowth and to extend earlier observations (1,2,3) to a wider range of naturalized lines and cultivars of varying morphology.

Methods

Small swards of 13 sub clover lines were grown in boxes in a glasshouse. Plants were established in early March at a density of 1100 plants/m^2, and were dependent on nitrogen fixation. Swards were defoliated by cutting off all leaf for the first time in early May when all swards had achieved at least 95% light interception. Regrowth was measured by harvests at 6, 14, 28 and 56 days after defoliation.

Results and discussion

The lines could be broadly grouped into tall and large-leaved types with low leaf and branch number (lines 1-4), short, small-leaved types with high leaf and branch number (lines 9-13), and intermediate types (Table 1). Later growth revealed that Pinjarra A, Darlington and Blackboy Hill were more intermediate types.

Table 1. Morphological characteristics and regrowth parameters during first regrowth period

Line	Before Defoliation				Regrowth Day 26			
	Sward Height (cm)	Area/ Leaf (cm^2)	Shoot DM (t/ha)	Leaf No /m^2 *10^{-2}	Crop Gth Rate ($g/m^2/d$)	Shoot Regrowth (t/ha)	LAI	Leaf No /m^2 *10^{-2}
Yarloop	24.5	6.0	3.1	89	4.3	.70	1.5	88
Blackwood	19.9	5.5	2.6	88	3.7	.64	1.5	98
Mt Barker	20.0	5.0	2.6	87	3.6	.62	1.3	71
Pinjarra A	20.9	5.1	2.5	89	2.6	.48	1.2	71
Mahogany Ck	16.8	3.2	2.3	124	3.1	.61	1.4	109
Blackboy Hill	20.5	4.1	2.8	120	2.7	.51	1.2	87
Collie B	18.8	2.9	2.9	169	2.2	.42	1.1	102
Mt Helena A	16.5	3.6	2.5	120	2.5	.47	1.4	106
Darlington	13.8	2.8	2.2	144	3.6	.61	1.5	131
Tooday B	15.6	2.7	2.2	149	3.3	.54	1.1	106
Daliak	15.3	2.7	2.3	145	3.1	.55	1.4	140
Geraldton	14.0	2.7	2.4	163	3.1	.57	1.4	144
Greenmount A	13.1	2.6	2.4	143	3.1	.51	1.1	92
lsd (P<.05)	1.2	0.7	.21			.14	.25	17

Crop growth rate and shoot DM 26 days after cutting were superior in the tall, large-leaved types (except Pinjarra A) to those in short, smaller-leaved lines (Table 1). Performance of intermediate lines ranged from intermediate to poorer than the small lines. Leaf number at day 28 was inversely correlated with area per leaf (r=.95). However, high leaf number generally did not compensate for small leaves at the plant density used.

These results appear to conflict with other published results which indicate that, under experimental conditions, compact, highly-branched types display an early regrowth advantage over larger types when subjected to regular low clipping (1,2) or complete defoliation (3). Plant densities in these studies ranged from around 2500 (1, 2) to 4225 (3). The density used in the present experiment is based on counts of well-established plants in mature, clover-dominant swards.

1. Rossiter, R.C. 1976. Aust. J. Agric. Res. 27 197-206.

2. Rossiter, R.C. and Collins, W.J. 1980. Aust. J. Agric. Res. 31 77-87.

3. Black, H.N. 1963. Aust. J. Agric. Res. 14 206-24.