Low density sowing can increase lucerne dry matter production

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Lucerne is an important component of both animal and crop enterprises. Growers often hesitate about sowing lucerne because of the costs involved in seed and establishment and because climatic conditions in central-western NSW do not guarantee success every year. To encourage the widespread use of lucerne in this environment there is a need to reduce costs of establishment. The aim of this trial was to demonstrate and quantify the effect of reduced lucerne sowing rates on establishment, production and survival in a low rainfall environment.

Method

In May 1998, lucerne (cv Genesis) was sown into a field trial at 3 different rates (1, 2 and 4 kg/ha) without a cover crop to estimate plant establishment and productivity. Dry matter yield was measured from 8 permanent 50cm quadrats on 7 occasions between January 1999 and September 2000; plant and stem numbers were also recorded.

Results

The key results from this trial are presented in Table 1. The 3 sowing rates were successful in establishing stands with different densities representing approx. 23, 32 and 39 plants per m^2. The plant numbers from each density have slowly reduced over time.

Table 1. Plant densities, cumulative dry matter and stem weights of lucerne at three sowing rates

	Density (plants/m^2)			Cumulative DM (t/ha)			Stem wt (g/stem)		
	1 kg/ha	2 kg/ha	4 kg/ha	1 kg/ha	2 kg/ha	4 kg/ha	1 kg/ha	2 kg/ha	4 kg/ha
Jan 99	22	32	39	1.6	1.4	1.2	nr†	nr	nr
May 99	24	34	39	3.1	2.5	2.7	0.60	0.38	0.46
Oct 99	25	37	44	5.1	4.1	4.2	0.41	0.27	0.26
Dec 99	25	35	45	6.2	4.8	4.9	0.33	0.19	0.19
Jan 00	24	33	40	8.7	6.6	6.9	0.57	0.40	0.40
Apr 00	19	26	33	9.9	7.6	8.0	0.44	0.34	0.35
Sep 00	17	23	27	11.9	9.1	9.6	0.49	0.37	0.39

† nr: not recorded

Highest dry matter yields were harvested from the lowest density plots (1 kg/ha seeding rate). This was equal to about 3 tonnes of extra production over the first 2½ years compared with the 2 kg/ha seeding rate. Plants in the low-density plots were much larger than in the higher density plots. They also had more stems to compensate for the extra space. The stem density remained equal over all treatments therefore the difference in total dry matter was due to larger, heavier tillers in the low-density plots.

Conclusions / recommendations

These results show that at low plant densities, lucerne can compensate for the reduced density by varying individual plant size, enabling good forage yields to be achieved from seeding rates as low as 1 kg/ha when sown without a cover crop. By sowing lucerne every year at a lower rate, growers can be more confident that in years with good rainfall they will be successful in establishing lucerne. Also, in poor years where establishment is not as successful the grower's financial outlay and risk is much lower.

It should be noted that rainfall in the year of establishment (1998) and subsequent years has been above average, which may have influenced the results since the lucerne has had excellent conditions to establish

and grow. Experience in this environment would suggest that in dry years the same establishment results might not be achieved.

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