Effects of irrigation frequency on the productivity of white clover, red clover and lucerne in northern Victoria

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The success of pure legume pastures in the irrigation areas of northern Victoria will, **in** part, be dependent on the development of suitable management strategies (1). This experiment was undertaken to study the effects of irrigation frequency on productivity.

Methods

This experiment was conducted at the Kyabram Research Institute on a red-brown earth soil (Dr 2.33). The design was a split plot with four replicates. The main plots were three frequencies of irrigation - 1, 2 and 3 - based on cumulative Class A pan evaporation of 40,8 0, and 120 mm, respectively. The subplots of 10 x 2m were three legume species - white clover (cv. Haifa), red clover (cv. Redquin) and lucerne (cv. Validor). Pasture production was measured by cutting. Yields are presented as cumulative totals for three periods: the first irrigation period (14 Sep. 1937 (sowing) - 12 April 1988), the rainfed period (- 1 Sep. 1988) and the second irrigation period (- 16 Feb. 198 9).

Results and discussion

Table 1. The effect of irrigation frequency on dry matter yield (t/ha).

Species	Frequency	Irrig. 87/88	Rainfed 88	Irrig. 88/89
White clover	1	8.06	4.02	10.91
	2	6.34	4.67	9.71
	3	4.03	4.52	8.00
Red clover	1	10.89	2.30	12.27
	2	9.99	2.02	12.31
	3	7.90	2.08	10.43
Lucerne	1	7.68	1.35	16.07
	2	7.12	1.39	16.28
	3	6.46	1.79	15.86
L.s.d. (P=0.05)	Irrigation	*	n.s.	*
	Species	*	0.45	*
	Interaction	1.34	n.s.	1.10

The data in Table 1 shows the importance of very frequent irrigation on the productivity of white clover on this red-brown earth soil compared with results from the Murrumbidgee Irrigation Area (2). Only the infrequent 120 mm treatment reduced yield of red clover relative to the other two more frequent irrigations, with lucerne productivity not significantly affected by this range of irrigation frequencies.

Intensive studies of net photosynthesis and leaf water potential during regrowth of white clover in Feb 1987 indicated water stress began after evaporation of 30-35 mm when irrigated at frequency 1 but not until 40-45 mm evaporation at the longer irrigation intervals. Frequent irrigation, although hastening the onset of water stress, had the highest DM yield.

1. Mason, W.K., Kelly, K.B., S.J. and Stockdale, C.R. (198 7). Proc. 4th Aust. Agron. Conf. p. 100-117.

2. Lattimore, M.E. and Thompson, J.A. (1987). Proc. 4th Aust. Agron. Conf. p. 312.