

Performance of seven lucerne cultivars growing in saline soils

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Recent observation and data (1) have shown that under moderately or highly saline conditions in a range of rainfall zones, salt-tolerant plants reduce the salt content in the surface soil. An examination of the chloride ion concentration in the profile (to 60 cm) before and after treatment indicated the marked decrease in surface salinity with revegetation (1). *Medicago sativa* is a moderately salt-tolerant perennial and an important plant for treatment of salt-affected land (2). Previously the cultivar Hunter River was recommended for this purpose. At present in Victoria, the salt tolerance and performance of the new aphid-resistant American lucerne cultivars in saline soil are not known. For this reason a program is being carried out to select the best cultivars for salt-affected soils.

Methods

In 1978, seven cultivars were sown in two trials in the Birchip and Bacchus Marsh areas at the rate of 10 kg ha⁻¹ in replicated and randomized blocks (10m x 10m). Fertilizer application was 200 kg ha⁻¹ of super and ammonia 2:1 (N6.9:P14.4) in both trials. Samples for dry weight measurement were cut twice yearly using a quadrat of 1/4m². The surviving plants within each plot were counted at intervals during the course of the trial.

Results and Discussion

Mean DM yields and percentage of plants surviving over three years are shown in the table.

Table 1. Dry matter production (kg ha⁻¹) and percentage of plants surviving between 1978-1980.

Cult-ivars	Site		Rainfall: 304mm., ClX: 1.07, Soil texture: sand, pH 7.8			Rainfall: 558mm., ClX: 0.30, Soil texture: clay, pH 8.3						
	Year		1978	1979	1980	1978	1980	1978	1979	1980	1978	1980
	DM Yield			Survival %		DM Yield			Survival %			
WL 311	80	80	130	12.8	16	365	635	635	54.2	46.3		
WL 318	20	10	20	2.5	2-	60	50	10	10.5	2.6		
AS 49	35	20	-	3.1	-	80	90	35	12.8	5.8		
WL 451	420	440	450	47.8	37.9	330	360	390	39.2	29.5		
WL 508	30	30	-	3.1	-	-	-	-	-	-		
WL 512	130	120	125	16	15.3	320	300	340	32.6	26.8		
WL 514	100	50	30	18.2	2.8	300	310	300	30.5	25		

The above data indicate that cultivars WL 311 and WL 451 survive better than other lines in highly saline conditions. The dry matter yields were very low; however, the result showed that WL 451 has potential on sandy soil but to a lesser degree on clay soil, whereas WL 311 is the highest yielding (635 kg ha⁻¹) cultivar on clay soil. The evaluation indicated that both WL 311 and WL 451 are salt-tolerant but further testing of the new *M. sativa* cultivars in various environments is warranted before a final assessment can be made.

1. Mitchell, A., et al. 1978. 11th International Soil Science Congress Edmonton, Canada, 1-36.
2. Zallar, S. 1975, 1977, 1980. Soil Stabilization and Revegetation Manual, SCA, Victoria.

