Species for Saline Soils on the Northern Tablelands

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Soil salinity on the Northern Tablelands is confined to small localised discharge areas (usually 1 or 2 ha) which are often situated where ground water movement is restricted at the transition between permeable soils on the slopes and heavier clay soils on drainage plains. While generally there has been little increase in the area of affected soils, the history of rapid expansion in other parts of the country and a perceived increase in the area affected at some Tableland sites prompted attention to strategies for combating the problem.

The strategy considered was firstly, to introduce vigorous salt-tolerant pasture species to revegetate bare areas and replace existing unproductive species, mainly couch (*Cynodon dactylon*) and swamp foxtail (*Alopecurus geniculatus*). Secondly, to lower ground water levels by establishment of trees along the transition between slope and flat at the perimeter of the salt-affected area.

Species trials were undertaken at Cameron's Creek, 35 km west of Glen Innes, to identify: (1) suitable pasture grasses and legumes, and (2) adapted tree species. The site of the trials is moderately saline, having ECE readings in the surface soil (0-8 cm depth) of 6.3, and at 15-30 cm depth of 4.1.

PASTURE SPECIES TRIAL

The trial site was sown on 13th and 14th November 1990 into a very rough seedbed consisting of large hard clods and only a small proportion of loose soil. Seed of 21 pasture species in 4 replications was broadcast by hand at 20 kg/ha with 167 kg/ha Mo superphosphate, with or without a layer of mulch (straw c. 20 mm deep). Plots (4 m x 1.5 m) were watered over summer to aid establishment.

Failed plots were resown on 28/5/91 at which time all plots were topdressed with in 167 kg/ha SF45 fertiliser. An estimate of ground cover in April 1991 and plant density of all sown species in January 1992 is presented in Table 1.

Table 1: Ground cover (%) on 30/4/91, and plant density on 16/1/92 of sown species.

	Ground cover 30/4/91			Density 16/1/92[A]
	+mulch	-mulch	Mean	plants/ m^2
GRASSES				
Puccinellia *Puccinellia ciliata*	0	0	0	65
Tall Wheat grass *Thinopyrum elongatum*	42	10	26	15
Wheat grass *Elymus scaber*	-	-	-	35
Fescue *Festuca arundinacea* (cv Demeter)	1	1	1	8
Fescue *Festuca arundinacea* (cv Triumph)	17	1	9	14
Phalaris *Phalaris aquatica*	25	1	13	11
An. ryegrass *Lolium rigidum*	-	-	-	9
Per. ryegrass *Lolium perenne* K.V.	0	0	0	0
Kikuyu *Pennesitum clandestinum*	77	50	63	110
Rhodes grass *Chloris gayana* (cv Callide)	100	92	96	18
Paspalum *Paspalum dilatatum*	2	17	9	6
Prairie grass *Bromus catharticus*	0	0	0	5
Brown beetle grass *Diplachne fusca*	11	30	20	6
LEGUMES				
Strawberry clover *Trifolium fragiferum*	6	5	5	13
White clover *Trifolium repens* cvHuia	1	1	1	4
Barrel medic *Medicago truncatula*	0	0	0	0
Lucerne *Medicago sativa* cv Aurora	0	0	0	0
Birdsfoot trefoil *Lotus corniculatus*	1	3	2	35
Maku Lotus *Lotus pedunculatus*	5	1	3	3
- *Lotus tenuis* 115629	1	0	0	7
- *Lotus tenuis* 115630	0	0	0	0
Mean	**15.3**	**11.1**	**13.2**	

[A] mulched plots only

Table 2: Number of trees surviving in October 1991 out of maximum eight planted.

Species	Number	Species	Number
Acacia dealbata	6	*E.macarthuri*	8
A. rubida	2	*E.camaldulensis* cv Silverterton	2
Casuarina cunninghamiana	8	*E.archeri*	7
C. glauca	7	*E.amplifolia*	4
Melaleuca halmaturotum	2	*E.accaciiformis*	5
M. styphiloides	0	*E.bridgesiana*	8
M.incana	1	*E.melliodora*	8
Eucalyptus crennulata	8	*E.caliginosa*	4
E.dalrympleana	7	*E.pauciflora*	6
E.stellulata	6	*Leptospermum flavescens*	7
E.viminalis	8		

TREE SPECIES TRIAL

In March 1991, after spraying with glyphosate and cultivating to remove resident vegetation, 21 species of tree seedlings were planted in a randomised nearest neighbour block with 8 replications having one of each species represented in each replication. Weed control was limited to the initial cultivation. The rate of tree survival in October 1991 is shown in Table 2.

RESULTS & CONCLUSIONS

Pasture grasses showing tolerance at the early stage of the trial were kikuyu, Rhodes grass, and tall wheat grass. The most consistent legume was strawberry clover cv. Palestine. Mulch appeared to aid establishment. Other introductions were also gradually colonising the site by 1992, especially puccinellia and birdsfoot trefoil (*Lotus corniculatus*). About half the tree species tested were found to be unsuited, but whether the cause is climatic or edaphic is uncertain. The survival of species is to be monitored over time.

ACKNOWLEDGMENTS

We are grateful to Mr G.Moore, "Tangoa" for the site and Mr H.Ryan for assistance in the field.