

Establishment and development of surface-sown pastures on black earths near Coolah

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Large areas of nitrophilous weeds that occur on the black earths near Coolah could be controlled by sowing perennial grasses and legumes. Because of the self-mulching nature of the soil surface the opportunity was taken to test the possibility of establishing perennials from surface sowing in this area which has a different environment to the tablelands where surface sowing is generally used (1,2,3).

Methods

In 1981, 1982 and 1983 improved species (*Medicago sativa*, *Phalaris aquatica*, *Dactylis glomerata*) were surface-sown after herbicide treatment (Table 1) of nitrophilous weeds (*Silybum marianum* and annual grasses). Seeds were treated with bendiocarb to reduce losses from seed-harvesting ants and a P + S fertilizer applied. Rainfall in the five months after sowing in 1981, 1982 and 1983 was, respectively: 335, 80, 316mm.

Results and Discussion

Sown species established in 1981 and 1983 (Table 1) but not in the drought year of 1982. In 1981 and 1983 establishment was aided by herbicide treatment, the most effective treatment varying between years. Development of the pasture sown in 1981 was affected by the 1982 drought which caused greater loss of *P. aquatica* on the glyphosate and 2,2-DPA+ amitrole treatments than on the 2,2-DPA+ 2,4-D treatment (Table 1). Development of the pasture sown in 1983 proceeded well until the dry first half of 1986 (133mm) caused the death of some perennial grass plants. Although *AL sativa* declined over time in both the 1981 and 1983 experiments nitrophilous weeds were controlled by the perennial grasses. In the 1982 experiment sown grasses established in 1983 and, by 1986, occupied 16% ground cover. The experiments showed that improved species can be established on black earths by surface sowing and can develop sufficiently to control nitrophilous weeds. Factors that assisted establishment included: a dry open soil surface which allowed seeds to enter, and with subsequent movement (self-mulching, rain), to be covered; one heavy fall of rain, rather than a number of light falls, to thoroughly wet the soil and give seedlings more time to grow to depth before the surface dried and opened; sowing before July to give plants the chance of attaining sufficient size to survive the following summer.

Table 1. Establishment (% Estab. viable seed) of *M. sativa* (Ai), *P. aquatica* (P) and *D. glomerata* (D) in 1981 and 1983 and subsequent development (% ground cover)

Herbicide	1981 experiment								1983 experiment							
	% Estab.				% ground cover				% Estab.				% ground cover			
	1981		1982		1983		1986		1983		1984		1985		1986	
	M	P	M	P	M	P	M	P	M	P+D	M	P+D	M	P+D	M	P+D
Glyphosate	36	13	27	13	43	3	6	11	8	31	5	51	5	76	6	35
2,2-DPA + amitrole	30	10	18	16	35	9	6	25	15	35	6	51	5	70	6	35
2,2-DPA + 2,4-D	6	12	11	18	20	14	7	34	24	45	7	60	6	72	6	38
Control	3	0	4	2	7	1	1	4	2	8	4	51	4	40	2	30

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