

## Effect of wheat stubble management during fallow

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Wheat yields in the north eastern wheat belt of Australia are strongly dependent on moisture stored during a summer fallow. Heavy summer rains can cause severe soil erosion during the fallow, consequently farmers are encouraged to retain stubble for erosion control rather than burn it.

Experiments were begun in 1976 to study the effect of varying stubble management practices on wheat yields and soil structure. Treatments imposed were 1) Burning of stubble; 2) Incorporation of stubble with discs; 3) Retention of stubble with a sweep plough, and 4) as for treatment No. 3, but with an additional 3 t ha<sup>-1</sup> of wheat stubble. Two sites were involved - a hard setting red clay loam near Tamworth, and a self mulching black earth on the Breeza plains. Treatments were split for nitrogen application; 0, 30 and 60 kg ha<sup>-1</sup> N on the red clay loam and 0 and 30 (60 in 1978) kg ha<sup>-1</sup> N on the black earth, applied as ammonium nitrate broadcast after seeding.

Surface soil moisture (0-10 cm) was monitored regularly on the black earth site in 1976 and 1977, and was usually higher under the retained stubble than in the burnt treatments. However, no difference in total moisture to 135 cm depth was recorded in either year (the profile was wet to 135 cm in each year).

Plots were seeded with a drill mounted on a scarifier and fitted with press wheels. Highest yields at each site in 1976 and in the black earth in 1977 were obtained on the burnt plots (Table 1). Yields on the black earth were positively correlated with establishment, but establishment alone was not sufficient to account for yield variation. Plant vigour appeared to be also involved. Yields on the red clay loam were very low in 1977 due to surface sealing and there were no significant ( $P = 0.05$ ) differences between stubble treatments. The only wheat grain yield response to nitrogen was on the red clay loam in 1977. There were no wheat grain yield interactions between stubble treatment and nitrogen application in any experiment. Disease did not appear to be a major factor affecting results.

**TABLE 1. Effect of stubble management on grain yield.**

Site	Year	Crop	Burn	Incorporate	Retain	Retain + Stubble	L.S.D. (0.05)
R.C.L.	1976	Wheat	1010	640	780	870	190
B.E.	1976	Wheat	2450	2260	1990	1870	320
B.E.	1977	Wheat	1860	1550	1520	1480	110
B.E.	1978	Sorghum-N	4700	4970	4760	3210	
		+N	4880	4940	5160	5080	
		L.S.D. (0.05)				1030	
			B.E. = Black earth		R.C.L. = Red clay loam		

Sorghum was sown on the black earth in 1978 following a long fallow, and there was no significant difference in yield between treatments sown with 60 kg N ha<sup>-1</sup>. However, yields were reduced under the high stubble treatment in the absence of nitrogen.