

## No-tillage crop production research in Northern N.S.W.

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Cereal cropping in northern N.S.W. is based on weed-free cultivated fallows of 6 to 10 months to allow accumulation of soil moisture. Severe soil erosion often occurs under this system. No-tillage crop production, which involves the elimination of cultivation, the retention of anchored stubble on the surface and the use of herbicides for fallow weed control, is known to greatly reduce the risk of erosion (1).

A co-operative research programme has been established to study the potential of no-tillage in northern N.S.W. in an endeavour to develop a more stable agricultural system. Soil erosivity, soil structure, grain yield, soil moisture accumulation, weeds and diseases are being compared for no-tillage and cultivated fallows. This paper reports on grain yield and soil moisture findings for 1981.

### Methods

Two basic rotations are being studied in replicated experiments: (a) wheat to wheat (w-w) and (b) wheat to grain sorghum (w-s). The wheat to wheat no-tillage fallow involves usually 3 to 5 knockdown herbicide applications. The cultivated fallow is achieved with conventional cultivation equipment, such as blade ploughs, chisel ploughs and scarifiers. For the wheat to grain sorghum rotation, a combination of atrazine and knockdown herbicides are used for the no-tillage fallow.

### Results and Discussion

Generally, yields for no-tillage wheat were similar to those for cultivated fallows, except at Winton, where yields were reduced, and Gurley, where yield was slightly increased under no-tillage. The Winton site has a hard-setting surface, and less water was accumulated during the fallow under no-tillage. The yield increase at Gurley was associated with increased soil moisture accumulation. No-tillage sorghum significantly outyielded sorghum grown on cultivated fallows in all three experiments, supporting the results of previous observation sites. Data indicate that these higher sorghum yields under no-tillage were associated with increased soil moisture storage.

Table 1. Yield of wheat and grain sorghum

Rotation	Site	Soil Type	No-tillage	Cultivated Fallow
			wheat yield t ha <sup>-1</sup>	
w-w	Gurley	Grey clay	1.3	1.1*
1981	Warialda	Black earth	3.9	4.2
	Breeza	Black earth	2.4	2.4
	Winton	Red clay-loam	0.8	1.4*
			sorghum yield t ha <sup>-1</sup>	
w-s	Tamworth (a)	Red clay-loam	2.7	2.1*
1980-81	Duri	Black earth	1.8	1.4*
	Tamworth (b)	Black earth	5.4	4.0*

\*Tillage significant (P < 0.05)

1. Marston, D., and Donaldson, S. G. (1980). Proc. Australian Soil Science Society Conference, Sydney. p.74.