

Yield ceiling for grain sorghum in the Ord River Irrigation Area

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Commercial yields of grain sorghum on Kununurra clay soils in the Ord have rarely exceeded 6 t ha in a single growth cycle. Best results are obtained in the dry season but are only about half the best commercial yields obtained in south-east Queensland even though mean temperatures do not differ greatly. An attempt was made to establish whether current crop management factors were limiting Ord dry season yields.

The well known hybrid Texas 610 SR and a taller hybrid NK300F were grown at four population densities ranging from 10 to 60 plants m⁻². There were two sowing patterns, isometric or triangular, and 0.75 m rows. Three seeds were sown per point with a special hand-operated rapid-planting probe used in conjunction with a drilled fibre-glass template that carried the required planting patterns. This resulted in virtually perfect plant stands with precise spacing and arrangement.

The plots were spray-irrigated at one- or two-weekly intervals at the rate of pan evaporation and adequate nitrogen was applied to give maximum growth.

There were three sowings on 18th April, 10th and 31st May with two replicates at each sowing. Apart from severe finch damage to T610 in the first sowing the management of the experiment went well, with no serious pest or disease problems. Yields were estimated from quadrat harvests at physiological maturity, which was taken to be when at least half the grain on 75% of the heads showed a black layer (A.A. Done, personal communication). Grain yields for density levels and planting arrangements are shown in Table 1.

Table 1. Yield of grain (tha⁻¹ at 14% moisture content) from three dry season sowing dates with two hybrids.

Planting pattern	Population density (plants m ⁻²)				Mean
	10.0	26.6	43.3	60.0	
Rows (0.75 m)	8.83	9.12	8.98	8.56	8.87
Isometric	9.81	9.75	9.18	8.57	9.33

The outstanding features of the results are the overall mean yield of over 9 t ha⁻¹ and the good yields from the relatively low densities, especially with the isometric pattern.

As modern suction plate planting machines can achieve such sowing patterns this last result has immediate value. The generally high level of yield in a season of close-to-average mean temperatures indicates that sprinkler irrigation is superior to the usual furrow irrigation. Work is needed on irrigation water management to seek the reasons for the superiority of spray irrigation,