

Uniformity of spacing, and grain yield, in sorghum

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In a number of trials here with grain sorghum, yields have been responsive up to and beyond 400,000 plants ha⁻¹, and have attained maxima of 14 t ha⁻¹ and more. This is not the experience in usual field trials, and the discrepancy might be caused by uniformity of plant spacing, relatively suppressed plants having low harvest indices.

Methods

Two trials were carried out in which the hybrid Tx610 was sown at 3 densities (100,000, 300,000 and 500,000 plants ha⁻¹) and 3 levels of uniformity of plant spacing in the row (CVs of 0, 0.15 and 0.25). Plots were harvested at maturity and weights of grain and total above-ground plant recorded on a single plant basis. Thus CVs of final plant weight were calculated and performance assessed against this variable.

Results and Discussion

For simplicity, results are discussed only in relation to extremes of density and uniformity of spacing. The patterns of variability in final plant weight induced by variability of spacing differed between the two experiments. In the first, the uniform spacing resulted in the same variability of both high and low densities, but non-uniform spacing increased the variability, particularly at high density. In the second experiment, final variability was practically independent of spacing and density.

Total yields increased with density and declined with non-uniformity of spacing. Therefore in experiment 2 there was a total yield response to density, independent of spacing uniformity, whereas in experiment 1, the density

response was much less, and yields lower in unevenly spaced stands. Harvest indices declined slightly with lower uniformity of plant size, but this was a small influence on grain yield compared with that of total yield. Patterns of grain yield were essentially those of total yield as described.

Grain yields therefore related to uniformity in the general way which had been hypothesised, but the detail of response was in conflict with some expectations. Explanations are required for why total yield declines with reduced uniformity, and why variation in spacing uniformity does not consistently lead to variability in plant yield.

	Initial CV	Experiment 1		Experiment 2	
		Low	High	Low	High
Final CV	0.0	.29	.29	.26	.28
	0.25	.53	.74	.26	.32
Total wt. (t ha ⁻¹)	0.0	9.3	14.7	11.5	22.0
	0.25	7.3	9.7	10.6	18.9
Harvest Index	0.0	.46	.44	.49	.45
	0.25	.41	.36	.48	.46
Grain wt. (t ha ⁻¹)	0.0	4.3	6.6	5.9	10.1
	0.25	3.0	3.5	5.4	8.8