

Spatial arrangements and wheat yields

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Wheat is conventionally sown in a poisson placement along rows 18 cm apart. This means that at a sowing rate of 60 kg ha⁻¹ a rectangular arrangement results with an average ratio of breadth to length of 1:6.4. Theoretical consideration (Donald 1963) and field evidence (Fawcett 1964) suggests that higher grain yields could be obtained from sowing in a square pattern. Many field studies have confounded densities with arrangement (Holliday 1963), thus the hypothesis has not been fully tested.

In 1978 we compared square planting with rectangular and poisson arrangements in 18 cm rows at three sowing rates. Wheat (cv Condor) was sown between 30 to 24 June 1978 at Cudal in central N.S.W., at a depth of 5 cm using precision drilled boards and harvested between 2 to 5 January 1979. Rainfall between sowing and harvest was 390 mm.

Significantly greater wheat yields resulted from square arrangements than rectangular ($p < 0.05$) and poisson ($p < 0.1$) (Table 1), largely due to more ears m⁻². Increasing the sowing rate significantly ($p < 0.05$) increased yield but there was no significant ($p > 0.05$) interaction between sowing arrangement and rate.

TABLE 1. Spatial arrangements, sowing rates and wheat yields (t ha⁻¹)

Sowing rate (kg ha ⁻¹)	Sowing arrangement			Mean
	Square	Rectangular	Poisson	
22.5	5.7	5.2	5.4	5.4
45	6.2	5.7	5.9	5.9
60	6.5	6.0	6.3	6.3
Mean	6.2	5.6	5.9	

Isd 0.5 for values within table and 0.3 for means.

These results support the theoretical arguments that square planting can lead to yield increases in wheat. However before this practise could be widely recommended it will be necessary to assess the effects of seasons, the reactions of different cultivars and better understand the dynamics of plant and tiller populations during the growth of the crop. Experiments to answer these questions are in progress.

Donald, C. M. (1963). Adv. Agron. 15: 1.

Fawcett, R. G. (1964). Nature, Lond. 204: 858.

Holliday, R. (1963). Fld. Crop Abstr. 16: 71.