

The influence of spatial arrangement on wheat yield

B.A. Auld, D.R. Kemp and R.W. Medd

Agricultural Research and Veterinary Centre, Orange, 2800

Wheat has been traditionally sown in a poisson series along rows circa. 18 cm apart. Theoretical models suggest that rhomboidal and square arrangements (which give the highest packing fractions) should produce yield increases over traditional and rectangular arrangements.

Methods

Experiments were conducted over three contrasting seasons on the eastern margin of the N.S.W. wheat belt near Manildra. Wheat (cv. Condor) was hand sown using precision-drilled boards.

Results and Discussion

Yield consistently decreased with increasing rectangularity (ratio of distance between rows to distance between plants within a row) at low sowing rates (Fig 1). This indicates that where low sowing rates are contemplated, use of a square/rhomboidal arrangement will produce higher yields than a rectangular arrangement. However spatial arrangement has a decreasing effect as sowing rate is increased.

The traditional poisson arrangement (results not shown) produced yields which were not significantly less than the optimal arrangement in any year.

Combine sowing patterns at about 60 kg ha⁻¹ in this area will produce maximal yields, effectively allowing for the likely range of environmental conditions.

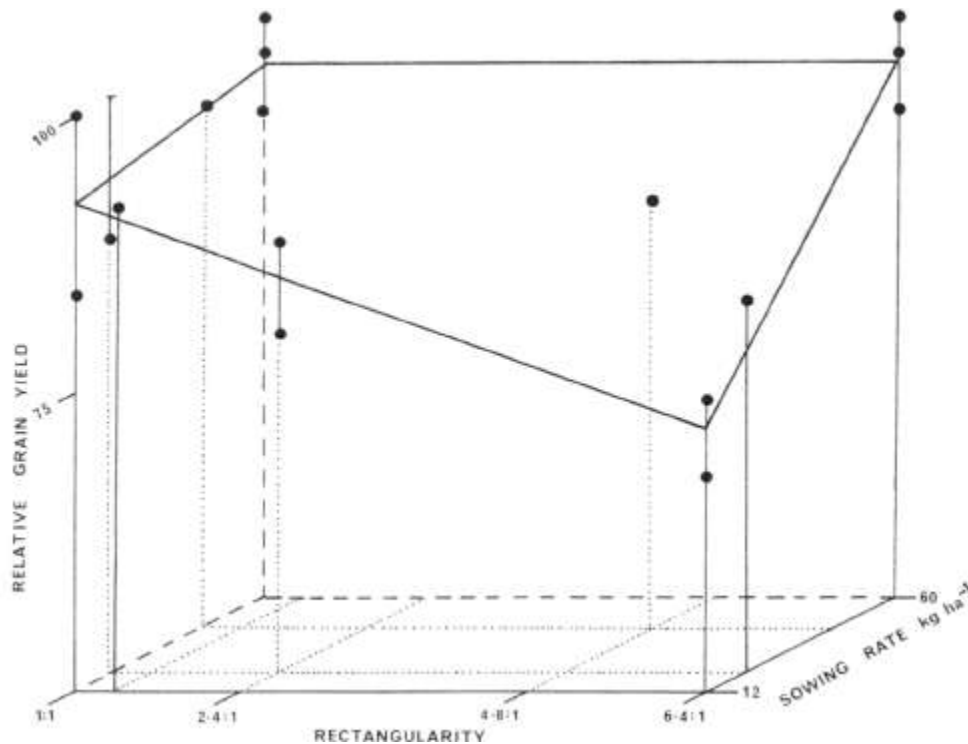


Fig. 1. Relationship of yield to rectangularity and sowing rate for precision sown treatments. Data from 4 experiments; maximum yield in each experiment normalised to 100; each dot represents a treatment mean in 1 experiment.