

Increasing inter-row spacing decreases wheat yield

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In southern Australia cereal crops are usually sown with an inter-row spacing of 18 cm (7 inches). To increase the efficiency of seeding where plant residues are present, tine spacing is often increased to 25-36 cm. However, reduced crop yield due to wider inter-row spacing may be negating the benefits of a more efficient sowing operation.

Methods

Seventeen trials in the central and eastern wheatbelt of Western Australia (1982-1985) compared row spacings. All trials were conducted in the absence of stubble. Sites were cultivated and fertiliser topdressed before seeding. Weeds were controlled with desiccant and in-crop herbicides. Inter-row spacings were varied from 9 to 54 cm in 9 cm increments. Not all trials included all spacings and some trials included up to 4 seeding rates (10 to 60 kg/ha). All trials used a randomised block design and were sown with wheat cv. Gamenya. Yield components were measured on some trials by hand-harvesting five one-metre row lengths, before machine harvesting.

Results and discussion

Analysis of variance indicated no significant interaction of inter-row spacing and seeding rate so that increases in plant density do not overcome the effects of wider inter-row spacing.

Yields from 9 cm spacing were greater than those from 18 cm spacing in 10 of 12 trials (4 significant $P < 0.05$); and yields from 18 cm spacing were greater than those from 27 cm spacing on six occasions ($P < 0.05$), with no significant difference in a further 10 trials.

The regression of mean yield against inter-row spacing for each trial was always negative. The regression coefficient 'b' is the change in yield per centimetre change in inter-row spacing and ranged from -2.2 to -29.1 kg/ha/cm. Averaged over all trials, the change in yield for a 9 cm change in inter-row spacing was 116 kg/ha, 6.6% of the predicted yield at 9 cm spacing.

Increasing inter-row spacing reduced crop biomass and ear density, but did not alter harvest index, grain size or hectolitre weight.

Our results confirm evidence from many other environments (1,2) that increasing inter-row spacing decreases cereal yield. What needs to be determined is whether the retention of plant residues (which might reduce inter-row soil evaporation) interacts with spacing and so overcomes the detrimental effect of wider spacings.

1. Holliday, R. (1963). *Fld Crop Abstr.* 16, 71-81.

2. Doyle, A. D. (1980). *J. Aust. Inst. Agric. Sci.* 46, 125-27.