

## The response of Uniculis and tillered barley to high seeding rates

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Donald (1) suggested that the yield of cereals grown under favourable conditions could be improved if cultivars based on an ideal plant type (ideotype) were developed. Such plants would have a short, strong stem, a high harvest index, small erect leaves, an erect, awned ear and a single culm. A breeding programme based on this ideotype was started with barley and early comparisons between the uniculis line WID-101 and the cultivar Clipper over a range of seeding rates demonstrated an overall yield advantage to the uniculis (2). Despite these encouraging results there is considerable debate among plant breeders and agronomists about the worth of the ideotype concept. Little field data are available on the relative performances of tillered and uniculis cultivars of wheat and barley and without this information it is difficult to judge whether the ideotype approach is a feasible means of improving yields. Therefore, this experiment was conducted to examine the growth and yield of tillered and uniculis cultivars of barley over a range of seeding rates.

### Methods

Two commercial cultivars of barley (Schooner and Galleon) and two uniculis lines (WM-103 and WID-105) were sown at seeding rates of 50, 150, 250, 300 kg/ha on 30 July, 1986 at Strathalbyn (mean annual rainfall = 492mm). Seedling numbers were counted at emergence and tiller numbers and dry weights were measured on 24 September (growth stage 30) and 20 October (growth stage 55-59). Grain yield and yield components were estimated from quadrat samples taken on 15 December.

### Results and discussion

Plant populations ranged from 85/m<sup>2</sup> to 415/m<sup>2</sup> with no significant difference in density between cultivars. Tiller and ear numbers increased up to the highest seeding rate with the two tillered cultivars producing more tillers/m<sup>2</sup> and ears/m<sup>2</sup> than the two uniculis at all seeding rates. Both Schooner and Galleon showed little response to seeding rate while within the uniculis yield was significantly lower only at 50 kg/ha (Table 1). In contrast to Donald's earlier work (2), there was no significant difference in the grain yield between the tillered and uniculis cultivars at seeding rates greater than 50 kg/ha. At 50 kg/ha the uniculis yielded significantly less than Galleon, while WID-103 had a yield similar to that of Schooner. The uniculis showed a greater plasticity in spikelets/ear and kernel weight, but this was insufficient to compensate for the fewer number of ears/m<sup>2</sup> at 50 kg/ha.

Table 1. Effect of seeding rate on the yield of tillered and uniculis barleys.

Seeding rate (kg/ha)	Cultivar			
	Schooner	Galleon	WID-103	WID-105
50	305	394	257	208
150	343	378	411	372
250	370	317	365	343
300	352	394	395	332
l.s.d. (seeding rate*cultivar: P<0.01):			Within seeding rate	= 77
			Other comparisons	= 100

1. Donald, C.M. 1968. *Euphytica* 17 385-403.

2. Donald, C.M. 1979. *J. Agric. Sci. Camb.* 93 261-69