

Yield maximization in malting barley

N.J. Mendham¹ and J.R. Essell²

¹University of Tasmania, Hobart, 7001 and

²Department of Agriculture,
Launceston, 7250.

Cereal yields in Europe have increased greatly in the last 20 years, due to improved cultivars and management. Yields in cooler areas of Australia have, however, increased little, Tasmanian mean barley yields being only about 2t/ha. Higher cereal yields would encourage local production to replace imported feed grain and allow export, particularly of malting barley.

Methods

To determine yield potential, Triumph, a good European cultivar, was compared with Shannon, a Tasmanian cultivar bred from Proctor with tolerance to Barley Yellow Dwarf Virus. Several sowings were made at two fertile sites, with two nitrogen levels, 30kg/ha applied at tillering, or 90kg/ha total applied at sowing, tillering and early stem elongation. Chlormequat was applied to some high nitrogen plots at early stem elongation, although there are more effective regulators for barley (1). Crops were irrigated when the soil water deficit reached about 60mm.

Results and Discussion

Table 1. Yields and components of barley crops sown 17 May 1983 at the University Farm, Cambridge, at two nitrogen levels. C = Chlormequat.

	Grain yield t/ha, 12% m.c.	Total top dry matter t/ha	No. of ears/ m ²	No. of grains/ ear	Mean grain dry wt. mg	% N in grain
Shannon 30N	5.93	13.5	620	22.8	41.7	1.67
90N	6.58	15.6	720	23.0	42.2	1.90
90N+C	6.92	17.8	820	23.5	40.5	1.83
Triumph 30N	10.00	19.3	930	24.7	43.8	1.42
90N	10.41	19.2	940	24.8	44.2	1.65
90N+C	10.87	20.4	1020	25.0	43.1	1.63
LSD .05	0.68	3.66	170	2.08	1.72	-

Yields of Triumph from the early sowings were very high (Table 1, for one site), due mainly to a large number of fertile tillers. Grain size and number were also slightly greater than in Shannon, and nitrogen content lower, indicating good malting quality. Shannon plants were 20cm taller than Triumph, showed some lodging and a lower harvest index. The high nitrogen level (similar to European usage) had more effect on Shannon, but gave a small yield increase in both cultivars, which, while not significant, was fairly consistent across replicates. Grain nitrogen levels in Triumph were still below the maximum of 1.75% accepted in the United Kingdom, whereas Shannon exceeded this figure. Chlormequat did not reduce stem length but did appear to increase ear number, at the expense of grain size, and the yield increase in both cultivars was again small but fairly consistent. In this favourable season these early sown crops required only one irrigation in October. Later sowings gave progressively lower yields, to 5.5t/ha from Triumph and 4.5t/ha from Shannon from an October sowing, when about 30% of Triumph plants suffered severely from virus infection. Later sowings needed more irrigation and hence much more water per kg of grain. Early sowings, therefore, give maximum yield potential and minimise irrigation requirement and the risk of virus infection. Further work is in progress to examine the interactions of these factors with nitrogen level (on less fertile sites) and growth regulators.

1. Read, B.J. 1982. Proc. 2nd Agronomy Conf., p. 234.

