Management techniques to improve barley yield and malting quality in S.A.

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In South Australia, the sowing of barley is often delayed because of a range of perceived/potential problems associated with early seeding. These include rank growth with possible lodging and increased incidence of foliar disease. If these problems were overcome, now possible due to advances in fungicides, and growth regulants. additional growing season could be utilized and possible improvements in yield and quality may be realised (I). Experiments were conducted to study the combined effects of seeding date, nitrogen fertilizer, fungicides and growth regulants on the yield and quality of several barley genotypes.

Methods

Over 4 seasons. 1981-1984. replicated trials based on a split plot randomized complete block design were used with treatments consisting of: (i) 3 seeding times - early, normal, late (early-mid May. mid June and mid-late July respectively); (ii) Fungicide - nil vs Erex(R) seed dressing 1.5 gkg^{-1} plus foliar applied Bayleton(R) 1.0 Lha^{-1}; (iii) Crowth Regulant - nil vs Terpal(R) 1.5 Lha-I or Helestone(R) 3 Lha^{-1}. 1981; (iv) Nitrogen fertilizer - nil vs 50 kg N ha^{-1} (broadcast as Drea at seeding); (v) A range of cultivars - Clipper. Schooner. Parwan, Shannon. Calleon, Forrest and Waite Institute selections - WI 2584, WI 2598. Basal application of nematicide, superphosphate and herbicides were used to optimise yield responses from other treatments. In addition to grain yields the quality components, crude grain protein, screenings 7. and 100 grain weight were measured for all treatments. Rainfall for each site as shown in Table 1 was characterized by being extremely high in 1981, extremely low in 1982 and average in 1983.

Results and Discussion

Table 1: The effect of seeding time, nitrogen fertilizer and fungicide on grain yield (tha^{-1}) and crude protein (7.) of barley in S.A. (1981 - 1983)

YEAR:SITE	TREATMENT	DATE OF SEEDING			APR.-OCT. RAINFALL	
		'EARLY'	'NORMAL'	'LATE'	TRIAL YEAR	MEAN
1981 NORTHFIELD	SCHOONER+NITROGEN	4.34 (9.7)	2.94 (10.7)	2.23 (14.2)	440	390
	-NITROGEN	3.47 (9.6)	2.46 (11.1)	1.99 (13.2)		
1982 TURRETFIELD	SCHOONER+FUNGICIDE	2.75 (15.6)	2.16 (16.2)	1.91 (17.7)	242	354
	-FUNGICIDE	2.86 (15.8)	1.79 (16.4)	1.75 (18.0)		
1982 URANIA	SCHOONER	1.85 (13.9)	1.18 (15.6)	0.86 (16.0)	199	350
1983 TURRETFIELD	SCHOONER+FUNGICIDE	4.53 (14.1)	4.88 (15.1)	2.32 (16.8)	403	354
	-FUNGICIDE	3.58 (13.2)	4.67 (14.0)	2.56 (15.7)		
1983 URANIA	SCHOONER	5.98 (14.8)	5.65 (15.3)	3.62 (16.4)	346	350

Note: Means over all other treatments. In parenthesis, crude grain protein. L.S.D. (P =40.05) to compare any two treatment means; Northfield 1981, 0.37 (0.32); Turretfield 1982, 0.62 (0.64); Urania 1982, 0.48 (0.36); Turretfield 1983, 027 (0.39); Urania 1983, 0.36 (0.80). Table I contains only the results of the most significant treatments for the malting variety Schooner.

For all years and cultivars, late sowing reduced grain quality and hence the chance of a malting classification as grain nitrogen levels increased. Over all years, early sowing resulted in highest yields and lowest grain protein. Lodging and the associated effects of growth regulants were minimal. The yield increase from disease control in early sowing treatments was significant in 1983 due to severe Leaf Scald. However low water availability at grain filling probably negated fungicide response when Powdery Mildew was severe in 1982. Nitrogen responses were recorded in only one trial (Northfield, 1981). Yield responses to nitrogen were greater and grain protein levels lower in early sowing treatments. Overall, the results suggest further research, particularly in the area of soil water management, would be useful.

1. Ridge, P.E. and Mock, I.T. 1975. Aust. J. Exp. Agric. Anim. Husb. 15: 830.