The importance of sowing depth for Otane and Batten wheat

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Introduction

Usually the recommended sowing depth of wheat (*Triticum aestivum* L.) is 30 mm (Wibberley, 1989). Sowing at depths greater than 30 mm can result in decreased emergence and hence decreased establishment. Often, decreased emergence with increased sowing depth is due to emergence of leaf 1 from the coleoptile underground (Allan *et al.*, 1962; Sunderman, 1964). The leaf continues to extend but is less rigid than the coleoptile and is unable to push through the soil. The effect of deep sowing on emergence percentage is dependent on cultivar. In several studies using a wide range of cultivars, a strong positive correlation between final coleoptile length and emergence percentage from deep sowings was found (Sunderman, 1964; Whan, 1976). This paper summarises data from field trials carried out over three years which examined the effect of sowing depth on emergence percentage of two wheat cultivars commonly grown in New Zealand (Hines *et al.*, 1991).

Materials and Methods

Seed of wheat cultivars Otane and Batten was obtained from Elders Pastoral, Christchurch, New Zealand and from Crop Research Division, DSIR, Lincoln, New Zealand, respectively. Seed was treated with Bayatan F17 and showed >90% germination. Experiments were carried out on a Templeton silt loam at the Lincoln University Research Farm, Lincoln in 1989, 1990 and 1991: sowing dates and depths are given in the text. In all experiments, the site was ploughed, Dutch harrowed and rolled prior to spraying. Seed was drilled with an Oyjord drill in rows 15 cm apart. Emerged seedlings were counted at the two to three leaf stage. In 1991, ten emerged and ten non-emerged plants were sampled randomly from each plot for measurement of coleoptile length. Further details of Materials and Methods are given in Hines *et al.* (1991).

Results and Discussion

For both Otane and Batten, emergence percentage decreased as sowing depth increased from 30 to 90 mm (Table 1). In all experiments, this decrease was greater for Otane than Batten. Previously, decreased emergence with increased sowing depth was related to emergence of leaf 1 from the coleoptile underground. This is likely to have been the case here also, as for both cultivars, coleoptile length for non-emerged plants was less than the sowing depth (Table 2; see also Andrews *et al.*, 1991). Differences between cultivars with respect to

Table 1. Effect of sowing depth on emergence percentage of wheat cvs. Otane and Batten. Emergence percentage was determined at the 2-3 leaf stage.

Sowing Date	Sowing Depth (mm)	Emergence (%) Otane	Batten
9 June 1989	41	66	89
	67	52	85
SEM		1.2	
21 Sep. 1990	30	72	80
	60	52	77
	90	41	71
SEM		2.2	
14 May 1991	59	54	64
	85	45	63
SEM		1.6	

Table 2, Coleoptile length of emerged and non-emerged seedlings of wheat cvs. Otane and Batten. Seed was sown on 14 May 1991. Plants were sampled when emerged plants were at the 2-3 leaf stage.

Sowing Depth (mm)	Coleoptile Length (mm) Emerged		Non-emerged	
	Otane	Batten	Otane	Batten
59	54	63	46	56
85	63	85	54	57
SEM	1.4		2.4	

emergence percentage from deep sowings have also been related to coleoptile length. Again, this is likely to have been the case in the present study since for emerged plants at both sowing depths and non-emerged plants at 59 mm sowing depth, coleoptile length was greater for Batten than for Otane (Table 2; see also Hines *et al.*, 1991).

Conclusions

1. The emergence percentage from deep sowings is greater for Batten than for Otane.
2. This cultivar difference is related to coleoptile length.
3. Sowing depths greater than 30 mm are likely to cause a substantial reduction in emergence percentage of Otane.

References

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