

## Yield potential of semidwarf wheat and the effect of lodging

M. Stapper and R.A. Fischer

CSIRO, Centre for Irrigation and Freshwater Research, Griffith, N.S.W. and CSIRO, Division of Plant Industry, Canberra

Lodging has commonly been observed in heavy, early sown crops with a yield potential of more than 6 t/ha thus confounding breeding and management interpretations of yield trials. In 1985 at Griffith, we carried out two experiments to evaluate the lodging effects on yield potential.

### Methods

Experiment 1 was sown on 22 April with the winter wheat variety Osprey. Treatments were: (1a) full protection against lodging, (1b) natural lodging, (1c) spraying with growth regulators (Cycocel on 24 July, Ethrel on 6 September), and (1d) simulated grazing by mowing the crop on 3 July. Experiment 2 was sown on 12 June with spring wheat varieties Yecora 70 and Egret and had treatments of nil (2a,g), natural (2b,h) and artificial (2c,d,e,f) lodging (See Table). Lodging was prevented where necessary by growing crops through weld mesh. The crops were irrigated and had a high nitrogen status.

### Results and Discussion

Treat- ment	Lodg. start (+)	Final lodg. score	Grain yield (oven dry) (g/m <sup>2</sup> )		Kernel number (/m <sup>2</sup> )	Kernel weight (mg)	Total dwt (g/m <sup>2</sup> )	Harv. index (%)	Grain protein (%)
<u>Osprey</u>									
1a	-	5	891	100	26000	34.3	2392	37.3	12.5
1b	A-80d	88*	565*	63	17800*	31.7	2070*	26.9*	14.1*
1c	A-80d	80*	558*	63	20300*	27.3*	1975*	28.8*	14.2*
1d	A+ 1d	93*	485*	54	17400*	28.4*	1816*	27.0*	14.4*
<u>Yecora 70</u>									
2a	-	0	786	100	18800	41.9	1776	44.1	13.9
2b	A+14d	35*	670*	85	18700	35.9*	1612	39.7	-
2c	A- 9d	38*	700*	89	18100	38.8	1759	41.4	13.8
2d	A+ 6d	66*	558*	71	17700	31.8*	1512*	35.4*	14.4
2e	A+21d	94*	573*	73	18200	31.5*	1497*	37.9*	14.9*
2f	A+35d	89*	717	91	18500	38.8	1691	42.4	13.7
<u>Egret</u>									
2g	-	0	740	100	22500	32.9	1962	37.0	11.2
2h	A+ 1d	57*	489*	66	15100*	32.5	1643*	30.8*	12.3*

+ Start of lodging relative to the date of anthesis (A).

\* Significantly different from nil lodging.

Anthesis for Osprey, Yecora and Egret occurred on 6, 10 and 15 October, respectively. Crop 1a produced 24 t/ha of dry matter. Such early sown crops produce a lot of vegetative growth during winter which does not contribute to grain production, but increases the risk of lodging. Growth regulants proved to be ineffective under these conditions. Mowing also could not prevent lodging. The short season variety Yecora 70 was the most efficient producer of grain. Lodging caused grain yield to be reduced from 10 to 40%, with the greatest effect when lodging occurred in the first 21 days after anthesis. These reductions are similar to those reported elsewhere for modern (1) and older (2) cultivars. Crop 2c which was artificially lodged before anthesis straightened up quickly, thus avoiding a more serious yield reduction. Kernel number per m<sup>2</sup> tended to be reduced by early lodging and kernel weight by later lodging, with associated increases in grain protein. A more detailed discussion, including lodging data from Mexico, is presented elsewhere (1).

1. Fischer, R.A. and Stapper, M. 1987. Field Crop Res. (In press)

2. Pinthus, M.J. 1973. Adv. in Agron. 25: 209-263.