

The effect of nitrogen on the yield and protein concentration of soft wheat

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The production of soft wheat with grain protein concentration of 9.5% (at 11% grain moisture content) or lower in south eastern Queensland would increase winter crop options and would include the use of N fertilisers.

### Materials and methods

Four cultivars of wheat (Grebe, Quarrion and Rosella, all soft wheats and Hartog, a prime hard wheat) were sown on 8 June 1989 and 0, 30, 60, 120 and 240 kg N/ha applied as ammonium nitrate. The trial was located on a black earth (62 kg/ha of nitrate N to 1 m at sowing) at The University of Queensland, Gatton College and was irrigated as required. Plots were machine harvested and the grain sub-sampled for protein analysis.

### Results and discussion

Cultivar and N significantly ( $P=0.05$ ) affected both grain yield (GY) and grain protein concentration (GP); N rate x cultivar interaction was significant ( $P = 0.05$ ) for GP. The later maturing Quarrion and Rosella had lower yield and higher GP than the earlier maturing Hartog and Grebe (Table 1). This was probably due to high temperatures during grain filling of Quarrion and Rosella. In all cultivars the initial increase in GY in response to N application was associated with limited increase in GP, findings that are similar to those of Strong (1). At N rates above 60 kg/ha GP increased substantially (Table 1) as the rate of increase in GY declined. Soft wheat of low GP will be able to be produced on soils of similar to or lower than the N status of the soil used in the present study when using N at 30-60 kg/ha, provided water supply is adequate and a cultivar of similar maturity to Grebe is used. The crop would need to mature before high temperatures reduce grain yield and increase grain protein concentration to unacceptable levels.

**Table 1. The effect of N on GY (t/ha) and GP (%) at 11% grain moisture content.**

N rate (kg/ha)	Hartog		Grebe		Quarrion		Rosella		N rate mean	
	GY	GP	GY	GP	GY	GP	GY	GP	GY	GP
0	4.80	9.0	5.12	8.9	3.35	10.8	4.12	10.3	4.35	9.8
30	5.90	9.5	6.20	9.2	4.06	11.2	4.22	10.7	5.10	10.1
60	6.47	10.1	5.87	9.7	4.44	11.1	4.76	11.2	5.39	10.5
120	7.08	11.0	6.11	10.9	5.02	12.3	4.74	12.4	5.74	11.6
240	6.80	12.1	5.36	12.2	4.26	13.6	3.90	14.5	5.08	13.1
Cultivar mean	6.21	10.3	5.73	10.2	4.23	11.8	4.35	11.8		

l.s.d. ( $P=0.05$ ) GY (N means) = 0.46; (cv. means) = 0.41; N x cv. = n.s.  
GP (N means) = 0.83; (cv. means) = 0.75; N x cv. = 1.66.

### References

1. Strong. W. M. (1981) Aust. J. Exp. Agric. Anim. Husband. 21, 424 - 431.