

Trial 24

Nitrogen uptake of three wheat varieties

Sponsored by Pivot Agriculture

Aim: to determine whether differences exist in the uptake of nitrogen between three commonly grown wheat varieties. If differences exist, to determine whether the advice given on sap nitrate and NIR tests would result in different fertiliser recommendations and yield outcomes.

Method: three varieties of wheat, Frame, Janz and Ouyen were sown with 18kg of P and 1.5kg of Zn fertiliser, in a replicated design. Treatments included the application of 53kg of N/ha (pre-drilled), 7kg of N/ha (with the seed) and a zero nitrogen treatment.

Measurements included soil water content and nitrate to 60 cm depth prior to sowing and post harvest, sap nitrate at the five leaf and end of tillering stages, and NIR-N at the end of tillering.

Results: Yield and protein

treatment	Frame		Janz		Ouyen	
	yield (t/ha)	protein %	yield (t/ha)	protein %	yield (t/ha)	protein %
0N	4.91	12.4	3.30	13.1	4.76	12.0
7N	4.53	12.6	3.36	12.7	4.58	11.2
53N	4.51	12.6	3.04	13.9	4.44	11.6
Significant difference	NS	NS	NS	NS	NS	NS

There was a significant difference ($P < 0.05$) in the yield and protein between varieties (with Frame and Ouyen yielding more than Janz) but there was no difference in yield and protein due to the different fertiliser treatments within a variety.

Sap nitrate and yield

Sap nitrates were taken at the five leaf stage and at the end of tillering. Significant differences in sap nitrate were observed between the three varieties but not with fertiliser treatments. Even though the differences in sap nitrate between varieties were significant, all readings were above the critical level required to grow the target of a 5.0 t/ha crop, and no further fertiliser was recommended.

NIR-N

NIR (Near Infrared Reflectance) is a relatively new technique for measuring the total amount of nitrogen in the tissue of wheat plants. Work undertaken in NSW has been used to calibrate response curves so that for a given nitrogen content in the plant tissue a nitrogen fertiliser recommendation can be made. The NIR technique recommended that no further nitrogen fertiliser be applied. There were no yield responses from the high inputs of nitrogen fertiliser.

N - Uptake

Nitrogen uptake was significantly different between the three varieties indicating that yield and protein responses to nitrogen fertiliser may differ between varieties.