

Wheat in the crop rotation

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Key findings

- Previous crop (legume, oaten hay, cereal or fallow) had no effect on wheat grain yield in 2014.
- Grain protein values were lower following a cereal where there was less available soil N at the start of the season.

Why do the trial?

Wheat is commonly grown at the beginning of a cropping rotation, to take advantage of high soil nitrogen reserves, residual stored soil moisture and low levels of disease and weeds. This is to ensure reliable wheat grain yield and protein.

New technologies such as the Harrington Seed Destructor, chaff carts and Clearfield wheat lines now mean that wheat could be grown at different positions in a crop rotation. Wheat normally follows a legume crop. Legumes provide known benefits such as weed control, disease control, nitrogen and stored moisture however, economically they are often less profitable than other break crops such as canola or oaten hay, and less reliable.

How was it done?

Plot size	5.0 m x 10.0 m	Fertiliser	DAP (18:20) + 2% Zn @ 60 kg/ha
Seeding date	15 th May 2014		
Crop variety	Mace wheat @ 180 plants/m ²		

The trial was a randomised complete block design with three replicates. In 2013 seven crop types were sown (Table 1) and in 2014 all plots were sown with Mace wheat which had two nitrogen application rates applied to all plots. Soil available nitrogen was sampled for wheat and pea plots which had 74 kg N/ha and 94 kg N/ha, respectively.

Table 1. Summary of previous crop sown in 2013 and nitrogen rates (kg N/ha) applied in 2014.

2013 crop	2014	
	Nitrogen rate 1 (kg N/ha)	Nitrogen rate 2 (kg N/ha)
Oaten hay	50	80
Vetch brown manure (BM)	0	80
Wheat	50	80
Fallow	25	80
Canola	50	80
Barley	50	80
Field peas	25	80

Results and discussion

Wheat grain yield in 2014 was unaffected by previous crop or nitrogen rate (Table 1), ranging from 4.53 – 4.86 t/ha (Table 2). This contradicts previous research that has shown benefits of sowing wheat after legumes. This could be attributed to above average rainfall in 2014, limiting the effect of stored moisture from 2013. Also only a small portion of legume N is available in the subsequent year and will continue to breakdown over a number of seasons.

Table 2. Summary of Mace wheat grain yield (t/ha) and protein (%) following different positions in the crop rotation averaged across both N rates at Hart, 2014.

	Grain yield t/ha	Protein %
Oaten Hay	4.53	9.2 ^c
Vetch BM	4.86	12.3 ^a
Wheat	4.71	10.0 ^{bc}
Fallow	4.67	13.2 ^a
Canola	4.59	11.0 ^b
Barley	4.77	10.7 ^b
Peas	4.77	10.3 ^{bc}
LSD (P≤0.05)	ns	1.3

This work does however, support previous research in the Mid-North under the GRDC water use efficiency project. Over a number of years the results showed wheat sown after a range of crop types yield equally as well. Wheat on cereal was able to yield as well as wheat following a legume, provided good management i.e weed control, time of sowing and nutrition were employed.

The protein values show wheat sown after a cereal generally has lower protein due to less soil available nitrogen and therefore more fertiliser N is required to contribute to grain protein. The N rates applied (Table 1) did effect grain protein with the average protein level for the 80 kg N/ha 1% higher compared to the 0, 25 and 50 kg/ha applied (data not shown).

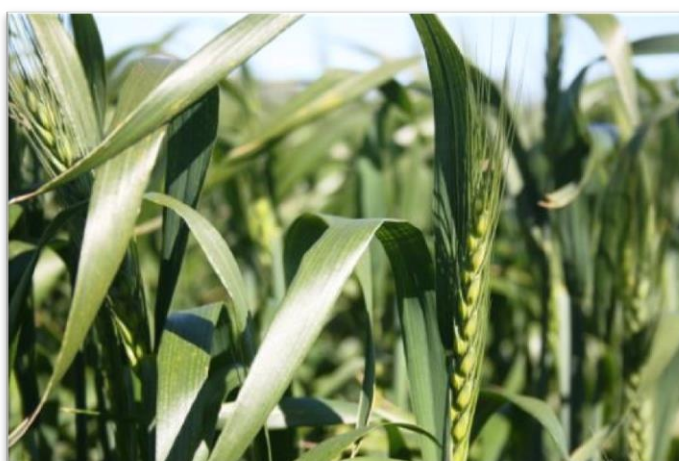


Photo: Wheat at Hart.