

Using High Sowing Rates to Control Weeds in Wheat

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Background

Weed pressure on crops appears to be continually increasing, particularly with increasing cropping intensity. The reliance on and expense of herbicides also adds to the cost of producing a crop. Farmers at Weethalle were interested in using a combination of alternative weed control methods to minimise the reliance on chemicals. The methods include using higher sowing rates, zero cultivation (other than sowing) and a variety of fertiliser rates. The aim was to examine the effect of these methods on the competition between wheat and weeds. Stocking rates are another possible weed control method but this was not addressed in this trial.

Methods

A demonstration trial was conducted last season (2000) that would enable a few more options to be examined and studied in greater detail in later trials. There were 2 blocks, one used as a cultivated treatment and one as an uncultivated treatment. Within each block were 10 sub-treatments that were variations in fertiliser and sowing rates. Cunningham wheat was sown at 40, 80, and 120kg/ha, MAP fertiliser was applied at 40, 80, and 100kg/ha. Each combination was sown and, in addition, a control plot of district practice (40kg/ha wheat, 80kg/ha MAP with Glean applied post emergent) was also sown. No plots received herbicides for weed control, apart from the control. Plots were 9m x 50m in size. Sowing occurred on 15th May, 2000 using a conventional 511 International combine. Measurements were taken throughout the season including plant counts, tiller counts, head counts, yield and grain analysis. Weed numbers and types were recorded at each stage.

Results and Discussion

A threefold increase in seeding rate resulted in a threefold increase in plant density but not a similar increase tillers or heads/m² (Table 1). The most obvious result of the trial was the fertiliser response, where 100kg/ha MAP promoted a healthier crop compared to when only 40 kg/ha was used. Grain yields ranged from 1.29 t/ha in the uncultivated plot where 80 kg/ha of seed was used with only 40 kg/ha of fertiliser. The highest grain yield was 3.16 t/ha, also in the uncultivated plot, where 120 kg/ha of seed was used with 100 kg/ha of fertiliser. This represents a >50% increase in yield relative to district practice. A urea test strip across the plots revealed a large response to nitrogen in all plots, however the nitrogen response was reduced in the 100kg/ha MAP plots.

Weeds observed were primarily ryegrass and wireweed, with a variety of other broadleaf weeds being present. The weed counts revealed weed numbers did not differ greatly between the cultivated and the uncultivated treatments. The size and the vigour of weeds differed between treatments. Weeds were least competitive when the soil was not cultivated as there was no seedbed for them to establish.

Harvest results from the trial showed a general increase in yield as both wheat sowing rate and fertiliser rate increased for both the cultivated and uncultivated treatments (see Tables 1 and 2). Visually the plots containing high rates of both fertiliser and seed were the best throughout the season. There was no appreciable effect of fertiliser or seeding rates on the screening (%) or test weights.

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Table 1. *Effect of sowing rate on the performance of a wheat crop sown at Weethalle (data averaged across fertiliser treatments).*

Sowing rate (kg/ha)	Pl/m ²	Tillers/m 2	Heads/m ²	Yield (t/ha)	Protein (%)	Test Wt (kg/hi)
Cultivated						
40	122	303	302	1.79	8.4	75.7
80	262	319	355	2.03	8.1	76.5
120	355	425	446	2.56	8.9	76.2
Uncultivated						
40	125	315	336	2.33	9.2	77.5
80	253	460	377	1.78	9.3	77.3
120	308	427	424	2.43	8.4	76.7
Control 40	194	297	299	2.02	7.9	76.0

Table 2. *Effect of the rate of applied fertiliser on the performance of wheat at Weethalle (data averaged across sowing rates).*

Fertilizer rate (kg/ha)	Pl/m ²	Tillers/m 2	Heads/m ²	Yield (t/ha)	Protein (%)	Test Wt (kg/hi)
Cultivated						
40	250	328	319	1.85	8.3	74.7
80	251	352	390	2.40	8.3	76.7
100	238	368	394	2.39	8.9	77.0
Uncultivated						
40	234	318	378	1.87	8.8	77.3
80	224	453	359	2.25	9.0	77.0
100	227	431	400	2.41	9.1	77.2
Control 80	194	297	299	2.02	7.9	76.0

In summary, high rates of seed and fertiliser could indeed be a useful tool for controlling weeds. Seed costs would be a little greater but the ability to control the weeds without using chemical - particularly in a situation where resistant weeds become a problem, could certainly make the cost acceptable.