Summit Tillage and Nutrition

Aim: To determine the productivity gains from deep tillage in conjunction with potassium and high phosphorus supply over a number of seasons.

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Company: SUMMIT FERTILIZERS
Co-operator: Agritech Crop Research

Farmer: Stuart McAlpine
Location: Liebe Long Term Research site, Buntine

Background: Potassium usage on cereal crops has risen dramatically over the past 5 years due to its profitable contribution to grain yield and quality. It has also been shown to have beneficial effects on leaf disease, drought and frost tolerance. From past trials conducted by Summit Fertilizers, drilled potassium has proved to be the most efficient way to spend your potassium dollar, as young plants can access the nutrient immediately. Summit Vigour® contains potassium in every granule and can be safely drilled with wheat.

The purpose of this trial is to determine the effect of drilled phosphorus and potassium when supplied to wheat at two different depths. The efficiency of drilled potassium when used with high rates of P is also evaluated. Deep ripping involves disturbing the soil below the normal cultivation layer without inverting the soil. It breaks up traffic-induced or naturally occurring compacted layers. Wheat roots can penetrate the ripped soil faster and deeper to absorb more soil moisture, capture more soil nutrients and improve yield (Jarvis 1994). Deep placement of nutrients helps to avoid toxicities by taking fertiliser salts beyond the root zone of sensitive, emerging seedlings. Deep nutrient placement is particularly important at high rates (wide rows) and in drying seedbeds. Deep placement also keeps nutrients in soil, which are moist for longer periods of time. Nutrients near the surface can be chemically available but plant unavailable when the surface soil is dry (Bowden 2001).

Trial Details:

Plot size and replication	2.2 x 20m, 3 reps
Soil type	Sand
Sowing date	18th June 2004
Conditions at sowing	Moist
Machinery	AUSPLOW DBS Point at 6 and 12 inch& 12 inch spacing
Seeding rate	75kg Wyalkatchem
Fertiliser	Basal 100kg N with 100kg UREA and 200kg MAXam IBS.
Herbicides and Insecticides	SpraySeed 2 L/ha Trifluralin 1.5 L/ha Trisulfuron 35 g/ha

	Chlorpyrifos	1	L/ha
	LVE MCPA	200	mL/ha
	Paragon	250	mL/ha
Paddock History	2003 = Lupin, 2002 = Wheat, 2001 = Canola		

Soil Test results:

Depth (cm)	P (ppm)	K (ppm)	Cu (ppm)	Zn (ppm)	S (ppm)	OC%	PRI	pH
0 – 10	19	77	0.4	0.5	17	0.82	3	4.90
10 – 20	10	43	0.2	0.3	8	0.2	2	5.10

Results:

Table 1: Potassium and Phosphorus response in wheat when applied at 15cm and 30cm working depths

#	Treatment	N	P	K	S	Yield kg/ha	% Nil
1	Nil 15cm	0	0	0	0	1813	100%
2	75kg MAPSZC/MAXam 15cm	10	11	0	10	2207	122%
3	100kg Vigour/Allstar/Max 15cm	10	11	7.3	12	2075.5	114%
4	125kg Vigour/MAXam 15cm	10	11	14.6	13	2091	115%
5	150 kg Vigour/MOP/MAXam 15cm	10	11	29.2	12	2145	118%
6	200kg Vigour 15cm	10	22	29.2	12	2145	118%
7	Nil 30cm	0	0	0	0	1990.5	110%
8	75kg MAPSZC/MAXam 30cm	10	11	0	10	2137	118%
9	100kg Vigour/Allstar/MAXam 30cm	10	11	7.3	12	2106.5	116%
10	125kg Vigour/MAXam 30cm	10	11	14.6	13	2052	113%
11	150 kg Vigour/MOP/MAXam 30cm	10	11	29.2	12	2253	124%
12	200kg Vigour 30cm	10	22	29.2	12	2283.5	126%
				LSD 0.01		293.3595	
				LSD 0.05		207.8829	
				CV		4.479985	

All treatments produced significantly (LSD 5%) more grain yield than the untreated control at 15cm working depth. While not significantly different from the 15cm working,

the 30cm untreated control produced 177 kg/ha more grain than the 15cm untreated control. (Table 1).

There was no significant response to applied potassium in this trial at either depth of placement. Applying 11kg phosphorus increased yield significantly from the untreated control at 15cm. Applying 200kg Vigour® at 30cm depth produced maximum yield. The poor yield response at this site may have been the result of a combination of late sowing and poor finishing rains. This trial will be repeated in 2005.

Summary:

- All fertiliser treatments significantly lifted grain yield from the untreated control with 15cm working depth.
- There was no significant response to applied potassium.

Technically Review By: Sandy Alexander, Agronomy Support Manager, Summit Fertilizer