4.6 USING FLUID FERTILISERS AS AN ALTERNATIVE TO GRANULAR FERTILISERS

Location: Willaura Trials 2001
(Fluid P and N trials)
Property of Pat Millear of Willaura.

Researchers:
Agrichem Manufacturing Industries P/L
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(Southern Region.)
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(SW Victoria and SE South Australia)

Background:
Over the past 10 years in South Australia, Dr Bob Holloway of SARDI Minnipa Research Centre, and his colleagues, have been working with different methods of increasing crop yields through the soil injection of fluid fertilisers, involving the placement of a continuous stream of fluid solution beneath the seed at a depth of about 25mm. This work was initially only with trace elements and was part of Dr Holloway's doctorate.

About six years ago this team embarked upon the use of P fertilisers in the fluid form.

The Eyre Peninsula and much of Australia's cropping area has inherent problems with P retentive soils eg Grey calcareous alkaline loams.

Agrichem became involved at about this time because of their need to find a P source that provided an alternative to the acidic form of Phosphoric acid. This was found in the form of PolyPhos® or Ammonium Polyphosphate.

Aim:
To provide the farmers with calcareous soils that were P retentive, with an alternative to P fertilisers which were continually becoming locked-up, as well as an economical and effective method for the application of these fertilisers

Assessments:
1st assessment was conducted by Leigh Wilson and Prof. Sylvester Bradley, (ADAS, Cambridge) using a group score method of Metric 10.
Growth stage – Z13/22
2nd assessment conducted by Andrew Lymburn and Leigh Wilson @ Z 15/23

Trial Method:

Seeding: Date - 30/05/01
Crop - wheat cv Goldmark
Rate – 85 kg / ha
Harvesting Date : 22/01/02

Herbicides:
Pre-seeding - site sprayed with Glyphosate by farmer
04/07/01- Post-emergence - site sprayed with Hoegrass@ 1.25 L / ha in volume of 85 L/ha

Weather: cloudy (approx 90% cover) and cold (approx 12^{0}C);
wind speed 5 km/hr WSW

Weeds: Annual rye grass (ARG) ¾ -leaf, Oats 2/3-leaf, Cape weed 2-leaf

Crop Growth Stage: Z 12/3

15/08/01- Post-emergence - Broadleaf spray MCPA 500 @ 500ml / ha + Ally @ 7g/ha + Dimethoate @ 250 ml / ha + Agriwett @ 0.1%

Weeds: Cape weed 6-leaf, Crassula 2-branches, Mustard 3-leaf, Wireweed 4/5in diameter

Crop Growth Stage: Z 15/23

27/09/01- Post emergence - Grass weed spray, Achieve @ 250g / ha to control ARG. This was regrowth and new growth since the Hoegrass application

Crop Growth Stage: Z 15/36/3

Observations:
Sections along the north side of the plots have been very wet and the Wimmera Rye Grass (WRG) growth has been prolific. It has partially reduced tillering and plant density in these areas by up to 40%. Cape weed growth has also been extensive with a number of plants developing to approx 450mm diameter before being sprayed on the 15/08/01.

LMAP Trial - Southern Region					
	Products	**Formulation**	**Rate / ha**	**Units of elements / ha**	
				N	**P**
1	LMAP	liquid	25 L	3.5	5.175
2	LMAP + UAN	liquid	15+38.44 L	2.1+12.3	3.105
3	LMAP + UAN	liquid	25+34.06 L	3.5+10.9	5.175
4	LMAP +UAN	liquid	50+23.13 L	7+7.4	10.35
5	MAP + urea	granule	80+13.92 kg	8+6.4	17.6
6	LMAP + NH323	liquid	15+38.44 L	2.1+12.3	3.105
7	LMAP + NH323	liquid	25+34.06 L	3.5+10.9	5.175
8	LMAP + NH323	liquid	50+23.13 L	7+7.4	10.35
9	MAP	granule	80 kg	8	17.6
10	DAP	granule	80 kg	14.4	16
11	Nil fertiliser				
12	LMAP	liquid	15 L	2.1	3.105
13	LMAP	liquid	50 L	7	10.35

Soil Test Results for Millears Paddock 2001:
(Tested by Pivot (0 – 10cm)

Test Constituents	Results
P (Colwell's)	54
Sulphur	12
Deep N (kg / ha)	134
pH (water)	4.8
Al (%CEC)	12
Organic C (%)	3
Na/Salt	minimal
K	high

Comment:
Paddock limed with 2.5 t / ha since test pre-seeding

Results:
The treatment at Willaura where Fluid fertilisers had been used, showed good growth early on in the season but as harvest drew near, the granular fertiliser treatments caught up in their growth. This was probably mainly due to increasing soil temperatures, allowing the plants to access soil-bound P more efficiently from the solubilised granules, whereas early in the season the fluid form of P, as LMAP, is a far more available form of P to plants especially in more inhospitable soil conditions. This result has been similar in other high rainfall areas where P is not normally considered to be bound in the soil.

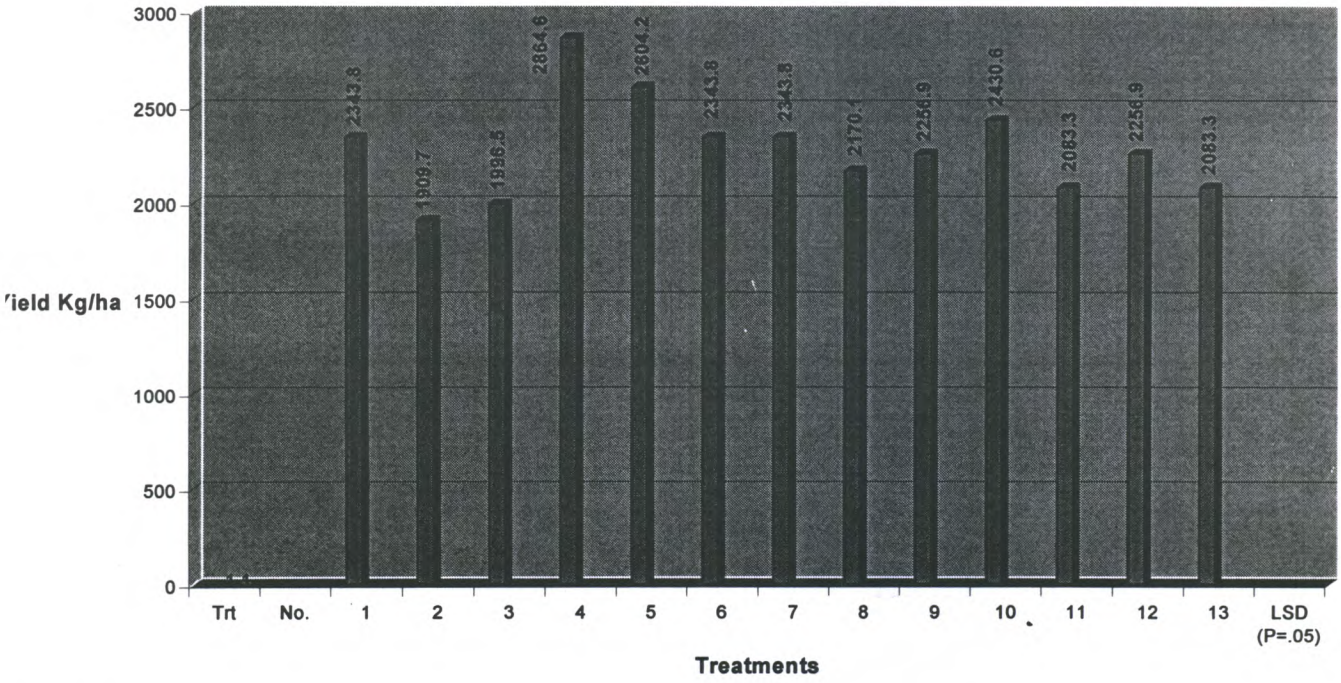
The tables and graph give some indication of the ability of liquids to perform at a level not significantly less than the granules

Comparative yield from liquid and granular fertiliser treatments:

Trt No	Treatments	kg / ha	
1	LMAP	2272.35	abc
2	LMAP + UAN	1889.89	c
3	LMAP + UAN	1994.26	bc
4	LMAP + UAN	2795.83	a
5	MAP + urea	2629.27	ab
6	LMAP + NH 323	2272.35	abc
7	LMAP + NH 323	2325.31	abc
8	LMAP + NH 323	2170.03	abc
9	MAP	2254.97	abc
10	DAP	2434.94	abc
11	nil fertiliser	2088.30	abc
12	LMAP	2220.60	abc
13	LMAP	2088.30	abc
LSD (P = 0.05) = 0.121 t			

It is obvious from the tables and the graph on the following page that treatment 4, which was a combination of LMAP (at the highest rate) and UAN gave the best yield in this trial. This would indicate that MAP (granule formulation) may need more N in order to compete with the liquid fertilisers. The other noteable result was that there was no significant difference between treatments 1, 6,7,8,9,10,11,12 and 13 in spite of the greatly varying units of P. The liquid P rates were basically less than 2/3 of the granular P levels.

Liquid P vs Granular P Willaura, Core Field site 2001



Conclusions:

Liquid P applications must be considered a viable option in these farming areas considering these results. It should also be pointed out that this is only one set of trial data in one year for this area. These results indicate that more trial work on LMAP needs to be conducted in the future.

Based on previous trials from other areas, the above results indicate that soils in these areas are able to tie up P and that the use of the liquid form of P as LMAP is a viable option for broadacre cropping where this occurs.

Finally this trial indicates that a positive yield response can be gained from additional use of N fertilisers, as seen in treatment 5, which was a combination of urea and MAP granules.