KELLERBERRIN
DEMONSTRATION GROUP

ON FARM TRIALS

2004

CONDUCTED BY
FARM FOCUS CONSULTANTS & CLIENTS

IN
KELLERBERRIN
WESTERN AUSTRALIA

ANNUAL RAINFALL 2004

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
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<th>Apr</th>
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<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
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<td>23.4</td>
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<td>7.2</td>
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<td>2.5</td>
<td>273.9</td>
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</table>

*GS = growing season rainfall (Apr - Oct)
Average annual rainfall for the last 100 years = 330.4mm
Rainfall in mm

Thanks to Jeff Russell (AgWA Northam) for assisting with trial design and data analysis throughout the season. The statistics package used is GENSTAT v 7.0. The analyses assumes a more structured experimental design (as opposed to large scale farm design), hence the trials can only be used as an indication of effect.
Soil Applied Potassium in Cereals

Potassium in Wheat – Dixon
Potassium in Barley – Curtis
Potassium in Wheat – Curtis
Potassium in Barley – Gorfin
Potassium in Barley – Gorfin
Potassium in Wheat – Gorfin
Potassium in Wheat – D Leake
Potassium Trial Results
Wheat
S & A Dixon

Site Details

Paddock: K5
Variety: Wyalkatchem
Soil Type: Duplex sand over clay
Row Spacing: 9 inch
Sowing Date: 17 May 2004
Seed Rate: 70kg/ha
Fertiliser: Potash @ 50kg/ha, Agstar Extra @ 70kg/ha + Flexi-N @ 50L/ha
Herbicide: R/up PMax @ 800ml/ha, Trifluralin @ 1L/ha, Monza @ 25g/ha
Treatments: 0, 25, 50, 100kg/ha of MOP

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha) on 15th March 2004. Soil samples were taken on 21st May on each of the nil (0kg/ha) plots, at 0-10cm, and 10-20cm depth. Potassium levels (Cowell mg/kg) were measured, and found to be as displayed in Table 1 below. Generally speaking, these levels are sufficient to high at the surface, and marginal to sufficient at depth.

Table 1

<table>
<thead>
<tr>
<th>Rep</th>
<th>Surface (0-10cm)</th>
<th>Subsoil (10-20cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>293</td>
<td>84</td>
</tr>
<tr>
<td>2</td>
<td>137</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>174</td>
<td>81</td>
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</tbody>
</table>

Nitrogen levels were found to be marginal at the surface, and low at depth, while phosphorous levels were sufficient, and at 2 sites high (surface in Reps 2 & 3). Interestingly, exchangeable sodium was significantly higher than potassium in the subsoil, the results being as follows: Rep 1 = 1.01:0.22, Rep 2 = 0.36:0.20 & Rep 3 = 1.48:0.21. If Sodium is higher than Potassium in the subsoil (ratio > than 1:1), potassium will be even less available to the plant.

Plant tissue tests were then taken on the 20th September from each treatment in each of the 3 reps. Potassium levels were found to be marginal across all treatments in all 3 reps, the results being displayed in Table 2 above. Nitrogen, Phosphorous and Zinc were also at marginal levels.

Grain yield was recorded on 3rd December, and was found to increase with increasing rates of potash. This increase was significant between the rates of 0, 50 & 100, and 25 & 100. Grain quality (protein, hectolitre weight and screenings) were recorded at the same time, but no significant differences in quality between any of the treatments were found.

The difference between the highest yielding treatment (100kg) and the lowest yielding treatment (0kg) is 0.12t/ha, which equates to *$22.92/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.
Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations.

The soil test results show that K was adequate (or close to adequate) in the top 0-10cm (>150ppm), but bordering on inadequate at depth (<80ppm considered marginal). To date, the practice of applying K to paddocks like this has been uncommon, because it is believed they will not be responsive if surface levels of K are adequate. However, at this site, grain yield responded to increasing applications of potassium, supporting our theory. The results support the data obtained from Curtis (barley only), Leake and Gorfin wheat potassium trials, which show similar trends in yield (most notably between the 0 & 25kg rates), suggesting we may get a response to K on soils not previously thought to respond.

This result suggests that a surface soil sample alone is not adequate as an indication of whether a site will be responsive to Potassium or not - we need to measure potassium levels in the subsoil too.

If this trial is to be repeated in 2005, we recommend soil samples be taken earlier (March), and plant tissue tests be done at mid tillering to improve reliability of results. Where possible, trials should be conducted in an ‘average’ season to determine the requirements for additional applications of potassium.
**Potassium Trial Results**  
**Barley**  
**D & R Lamplugh**

### Site Details

- **Paddock**: Little Dump  
- **Variety**: Hamelin  
- **Soil Type**: Light brown loamy sand  
- **Row Spacing**: 7 inch  
- **Sowing Machine**: Combine  
- **Sowing Date**: 1 June 2004  
- **Seed Rate**: 60kg/ha  
- **Fertiliser**: K Till @ 60kg/ha, Flexi N @ 50L/ha, Flexi-N @ 50L/ha (2/8), Flexi N @ 20L/ha (23/8)  
- **Herbicide**: R/up PMax @ 800ml/ha, Trifluralin @ 800ml/ha, Lexone @ 110g/ha, LV Ester 600 @ 750ml/ha, Bumper @ 200ml/ha (2/8), Bumper @ 200ml/ha (23/8), Le Mat @ 50ml/ha  
- **Treatments**: 0, 25, 50, 100kg/ha of MOP

### Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha). Soil samples were taken on each of the nil (0kg/ha) plots, at 0-10cm, and 10-20cm depth. Potassium levels (Cowell mg/kg) were measured, and found to be as displayed in Table 1 below. Generally speaking, these levels are sufficient at the surface, and marginal to sufficient at depth.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Surface (0-10cm)</th>
<th>Subsoil (10-20cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>130</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>130</td>
<td>112</td>
</tr>
<tr>
<td>3</td>
<td>113</td>
<td>62</td>
</tr>
</tbody>
</table>

Nitrogen levels were found to be marginal at the surface, and low at depth, while phosphorous levels were high at the surface, and sufficient at depth. Interestingly, exchangeable sodium was not significantly higher than potassium in the subsoil, except for Rep 1, where the results were 0.56:0.13. Reps 2 & 3 were 0.15:0.26, & 0.21:0.16 respectively. If Sodium is higher than Potassium in the subsoil (ratio > than 1:1), potassium will be even less available to the plant. These results suggest that K should be available.

Plant tissue tests were then taken on the 3rd August from each treatment in each of the 3 reps. Potassium levels were found to be sufficient across all treatments in all 3 reps, the results being displayed in Table 2 above. Nitrogen was marginal, Phosphorous was sufficient, and Zinc was at high levels across the site.

<table>
<thead>
<tr>
<th>Plant Potassium (K) Levels - Tissue Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>K Levels</td>
</tr>
</tbody>
</table>

Grain yield was recorded, but there were no significant differences found between any of the treatments, and no trends to speak of. Grain quality (protein, hectolitre weight and screenings) were recorded at the same time, with some interesting trends occurring. There were no significant differences between any of the treatments in regards to protein or hectolitre weight (although weight did show an increasing trend), however, screenings increased significantly between 0 & 100 as the rate of Potassium increased.

The difference between the highest yielding treatment (0kg & 50kg) and the lowest yielding treatment (25kg) is 0.08t/ha, which equates to *$14.32/ha (port equivalent).* For nett on farm price, subtract approximately $15 per tonne.

*Values per hectare are calculated on the basis of feed barley at $179.00 per tonne port equivalent (10 year average).
Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations.

The soil test results show that K was adequate (or close to adequate) in the top 0-10cm (>150ppm), but mostly inadequate at depth (<80ppm considered marginal). To date, the practice of applying K to paddocks like this has been uncommon, because it is believed they will not be responsive if surface levels of K are adequate. While grain yield did not respond at this site (nor did it in Gorfin's barley trials) there were some positive trends towards improvement in quality (and a significant improvement in screenings) as Potassium levels increased. These trends are supported by data collected from other sites, namely Dixon, Curtis and D Leake in 2004, suggesting we may in fact get a response to K on soils not previously thought to respond.

This result suggests that a surface soil sample alone is not adequate as an indication of whether a site will be responsive to Potassium or not - we need to measure potassium levels in the subsoil too.

Where possible, a repeat of this trial should be conducted in an ‘average’ season to determine the requirements for additional applications of potassium.
Potassium Trial Results
Barley
G & S Curtis

Site Details

<table>
<thead>
<tr>
<th>Site Details</th>
<th>Details</th>
</tr>
</thead>
<tbody>
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<td>Paddock</td>
<td>12</td>
</tr>
<tr>
<td>Variety</td>
<td>Hamelin</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Duplex</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>9 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>25 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>55kg/ha</td>
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<tr>
<td>Seeding Machine</td>
<td>Morris 9000 series bar with press wheels</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Agstar Extra Plus @ 80kg/ha + Urea @ 50kg/ha, Lime applied pre-sowing</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up &amp; Treflan @ 800ml/ha, Avadex Xtra @ 1L/ha, Diuron @ 200g/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>0, 25, 50, 100kg/ha of MOP</td>
</tr>
</tbody>
</table>

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha). A sub soil sample was taken in April, and found to be low in Potassium, with a Cowell mg/kg level of 19. Top soil 0-10cm was not tested, however older soil test results (1991) suggest surface levels of K to be marginal at around 99 on that part of the paddock.

Nitrogen and Phosphorous levels were found to be low at depth, while exchangeable sodium was significantly higher than potassium at 0.29:0.07, meaning the low levels of K were possibly even less available to the plant.

Two plant tissue tests were then taken at random from the site on the 29th July. Potassium levels were found to be marginal (2.46) to sufficient (3.71) respectively. Nitrogen levels were also marginal, while Zinc, Manganese and Boron were at high levels.

Grain yield was recorded on 5th November, and general speaking, was found to increase with increasing rates of potash. This increase was not significant with the Anova analysis, however it came close between 0 & 25 when analysed with REML. Grain quality (protein, hectolitre weight and screenings) were recorded at the same time, but no significant differences in quality were found, although there were some trends. All treatments produced feed grade barley.

The difference between the highest yielding treatment (100kg) and the lowest yielding treatment (0kg) is 0.19t/ha, which equates to *$34.01/ha (port equivalent).

*Values per hectare are calculated on the basis of feed barley at $179.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations. Unfortunately, the soil test results indicate that K was both marginal in the top 0-10cm, and low at depth on this site.
Grain yield showed a trend towards increasing with increasing applications of potassium, as we expected it to on a paddock with low levels of both surface and subsoil K. While not significant, the results support the data obtained at other sites (Dixon, Leake, Gorfin) in 2004, suggesting that both surface and subsoil need to be tested to determine if a site is responsive to K or not.

In this trial, as in the other K trials conducted by Leake, Curtis and Dixon, screenings showed a general trend towards decreasing (or remaining flat, as in Dixon’s trial) as K levels increased. This indicates that Potassium has a direct effect on grain quality in cereals.

If this trial is to be repeated in 2005, we recommend soil samples be taken at both surface and depth, and that the site be located where the results are either high on the surface, and low at depth, or vice versa. Plant tissue tests should be done on each treatment, to determine what effect Potassium is having on the crop, and where possible, the trial should be conducted in an ‘average’ season to reduce the risk of nutrients becoming unavailable because of lack of rain.
Potassium Trial Results
Wheat
G & S Curtis

Site Details

<table>
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<th>Paddock</th>
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<td>Variety</td>
<td>Calingiri</td>
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<tr>
<td>Soil Type</td>
<td>Duplex</td>
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<tr>
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<td>17 May 2004</td>
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<tr>
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<td>Seeding Machine</td>
<td>Morris 9000 series bar with press wheels</td>
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<tr>
<td>Fertiliser</td>
<td>Agstar Extra Plus @ 100kg/ha + Urea @ 70kg/ha, Lime applied pre-sowing, Urea top-up post sowing</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up &amp; Treflan @ 1.5L/ha, Logran @ 35g/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>0, 25, 50, 100kg/ha of MOP</td>
</tr>
</tbody>
</table>

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha). Two sub soil samples were taken in April, and found to be low in Potassium, with a Cowell mg/kg level of 34 at both sites. Top soil 0-10cm was not tested, however older soil test results (1998) suggest surface levels of K to be sufficient at around 123 on that part of the paddock.

Nitrogen and Phosphorous levels were found to be marginal at depth (N low at 1 site), while exchangeable sodium was significantly higher than potassium at 0.35:0.10, meaning the low levels of K were possibly even less available to the plant.

Two plant tissue tests were then taken at random from the site on the 29th July. Potassium levels were found to be high (4.37) to sufficient (4.20) respectively. Nitrogen levels were sufficient, while Zinc, Manganese and Boron were at high levels.

Grain yield was found to decrease slightly with increasing rates of potash until 50kg/ha, after-which yield increased significantly between 50 & 100. Grain quality (protein, hectolitre weight and screenings) were recorded at the same time. No significant differences were found between any of the treatments in protein or hectolitre weight, although there was a trend towards an increase up until 50kg/ha, after-which both protein and weight dropped off. Screenings decreased as Potassium application increased, the difference being significant between 0 & 100.

The difference between the highest yielding treatment (100kg) and the lowest yielding treatment (50kg) is 0.28t/ha, which equates to *$58.80/ha (port equivalent).

*Values per hectare are calculated on the basis of $210.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough
Potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations.

We would normally expect a site with marginal to sufficient levels of K at surface, and low levels at depth to show an increasing yield trend, however, in this case, yield declined as K rate increased until 50kg/ha. The yield results do not support the data obtained at similar sites in 2004 (Leake, Curtis) suggesting that more work may need to be done in future to determine the requirement for additional applications of Potassium in cereals.

In this trial, as in the other K trials conducted by Leake, Curtis and Dixon, screenings showed a general trend towards decreasing (or remaining flat, as in Dixons trial) as K levels increased. This indicates that Potassium has a direct effect on grain quality in cereals.

If this trial is to be repeated in 2005, we recommend soil samples be taken at both surface and depth, and plant tissue tests be done on each treatment to determine what effect Potassium is having on the crop. Where possible, the trial should be conducted in an ‘average’ season to reduce the risk of nutrients becoming unavailable.
Potassium Trial Results
Barley
G Gorfin

Site Details

Paddock          Pdk 42
Variety          Gairdner
Soil Type        Sandplain
Row Spacing      12 inch
Sowing Date      18 May 2004
Seed Rate        60kg/ha + BSN10 @ 5L/t
Seeding Machine  Nicholls Bar
Fertiliser       Pre seeding = Sulphate of Ammonia @ 100kg/ha, At seeding = Agflow @ 65kg, Triad @ 275g/ha, Early post em = Flexi N @ 50L/ha, Potassium Nitrate @ 3kg, Tower @ 200ml/ha, Late post em = Flexi N @ 30L/ha
Herbicide        At seeding = Glyphosate @ 0.5L/ha, Treflan @ 1.5L/ha, Metribuzin @ 187g/ha, Triasulfuron @ 10g/ha, Post em = Achieve @ 200ml/ha + diclofop methyl @ 200ml/ha
Treatments       0, 25, 50, 100kg/ha of MOP

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha) in May, just prior to seeding. No soil or plant tissue tests were taken, and there were no historical soil test results available to provide a rough guide as to the Potassium status of the paddock.

Grain yield was recorded, and while it appears to have increased between 0 & 25, then decreased, there were no significant differences between any of the treatments. Grain yield was, therefore, the same for each treatment. Grain quality (protein, hectolitre weight and screenings) were not measured, and final grade is unknown, so malt grade has been assumed for the calculations below.

The difference between the highest yielding treatment (25kg) and the lowest yielding treatment (100kg) is 0.23t/ha, which equates to *$49.91/ha (port equivalent).

*Values per hectare are calculated on the basis of malt barley at $217.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations. Unfortunately, no soil tests were done, so the theory cannot be tested.

Grain yield neither supports or disproves the results obtained at other sites (Dixon, Leake, Curtis, Gorfin) in 2004, so the question remains 'Could we have predicted this result using a soil test?'

If this trial is to be repeated in 2005, we recommend soil samples be taken at both surface and depth in early March, and that the site be located where the results are either high on the surface, and low at depth, or vice versa. Plant tissue tests should be done on each treatment at mid tillering, to determine what effect Potassium is having on the crop, and where possible, the trial should be conducted in an ‘average’ season to reduce the risk of nutrients becoming unavailable because of lack of rain.
Potassium Trial Results

Barley
G Gorfin

Site Details

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<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Paddock</td>
<td>Pdk 17</td>
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<tr>
<td>Variety</td>
<td>Stirling</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Grey clay</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>12 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>19 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>65kg/ha + BSN10 @ 5L/t</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Nicholls Bar</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Pre seeding = Sulphate of Ammonia @ 100kg/ha, At seeding = Agflow @ 65kg, Triad @ 275g/ha, Early post em = Flexi N @ 30L/ha, Tower @ 200ml/ha, Late post em = Flexi N @ 30L/ha, Tower @ 150ml/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>At seeding = Glyphosate @ 1L/ha, Treflan @ 1.5L/ha, Metribuzin @ 150g/ha, Triasulfuron @ 10g/ha, Post em = Achieve @ 200ml/ha + diclofop methyl @ 200ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>0, 25, 50, 100kg/ha of MOP</td>
</tr>
</tbody>
</table>

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha) in May, just prior to seeding. No soil or plant tissue tests were taken, and there were no historical soil test results available to provide a rough guide as to the Potassium status of the paddock.

Grain yield was recorded, and while it appears to have increased between 0 & 25, then decreased, there were no significant differences between any of the treatments. Grain yield was, therefore, the same for each treatment. Grain quality (protein, hectaritre weight and screenings) were not measured, and final grade is unknown, so malt grade has been assumed for the calculations below.

The difference between the highest yielding treatment (25kg) and the lowest yielding treatment (100kg) is 0.05t/ha, which equates to *$10.85/ha (port equivalent).

*Values per hectare are calculated on the basis of malt barley at $217.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations. Unfortunately, no soil tests were done, so the theory cannot be tested.

Grain yield neither supports nor disproves the results obtained at other sites (Dixon, Leake, Curtis, Gorfin) in 2004, so the question remains ‘Could we have predicted this result using a soil test?’

If this trial is to be repeated in 2005, we recommend soil samples be taken at both surface and depth in early March, and that the site be located where the results are either high on the surface, and low at depth, or vice versa. Plant tissue tests should be done on each treatment at mid tillering, to determine what effect Potassium is having on the crop, and where possible, the trial should be conducted in an ‘average’ season to reduce the risk of nutrients becoming unavailable because of lack of rain.
Potassium Trial Results
Wheat
G Gorfin

Site Details

Paddock: High Country
Variety: Westonia
Soil Type: Granite / Jam
Row Spacing: 12 inch
Sowing Date: 43 June 2004
Seed Rate: 70kg/ha + BSN10@ 4L/t
Seeding Machine: Nicholls Bar
Fertiliser: At seeding = Agflow CZ @ 65kg, Flexi N @ 50L/ha, Post Em = Mangcop @ 500ml/ha + Flexi N @ 30L/ha
Herbicide: Glyphosate @ 1L/ha, Chlorsulfuron @ 20g/ha, Diuron @ 300g/ha
Treatments: 0, 25, 50, 100kg/ha of MOP

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha) in early May. No soil or plant tissue tests were taken, and there were no historical soil test results available to provide a rough guide as to the Potassium status of the paddock.

Grain yield was recorded, and while it appears to have increased between 0 & 25, then decreased, there were no significant differences between any of the treatments. Grain yield was, therefore, the same for each treatment. Grain quality (protein, hectolitre weight and screenings) were not measured.

The difference between the highest yielding treatment (25kg) and the lowest yielding treatment (50 & 100kg) is 0.17t/ha, which equates to *$32.47/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations. Unfortunately, no soil tests were done, so the theory cannot be tested.

Grain yield neither supports nor disproves the results obtained at other sites (Dixon, Leake, Curtis, Gorfin) in 2004, so the question remains 'Could we have predicted this result using a soil test?'

If this trial is to be repeated in 2005, we recommend soil samples be taken at both surface and depth in early March, and that the site be located where the results are either high on the surface, and low at depth, or vice versa. Plant tissue tests should be done on each treatment at mid tillering, to determine what effect Potassium is having on the crop, and where possible, the trial should be conducted in an 'average' season to reduce the risk of nutrients becoming unavailable because of lack of rain.
Potassium Trial Results
Wheat
D Leake

Site Details

Paddock          E-3
Variety          Calingiri
Soil Type        Grey Loam
Row Spacing      10 inch
Sowing Date      5 June 2004
Seed Rate        65kg/ha
Sowing Machine   JD 1819 (16m wide)
Fertiliser       Agstar @ 80kg/ha + Flexi-N @ 60L/ha
Herbicide        Sprayseed @ 1L/ha, Trifluralin @ 1.5L/ha, Logran @ 35g/ha
Treatments       0, 25, 50, 100kg/ha of MOP

Results

Muriate of Potash (MOP) was spread over the site at 4 different rates (0, 25, 50 & 100kg/ha) one day after sowing, on the 6th June 2004. Soil samples were taken on the 5th August on each of the nil (0kg/ha) plots, at 0-10cm, and 10-20cm depth. Potassium levels (Cowell mg/kg) were measured, and found to be as displayed in Table 1 below. These levels are all marginal, and low to marginal at depth. At the first 2 sample sites, Potassium decreased at depth, but at the third, it increased slightly (associated with a greyish soil type).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rep</th>
<th>Surface (0-10cm)</th>
<th>Subsoil (10-20cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>46</td>
<td>36</td>
</tr>
<tr>
<td>25</td>
<td>2</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td>50</td>
<td>3</td>
<td>30</td>
<td>32</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Nitrogen levels were found to be marginal at the surface, and low at depth, while phosphorous levels were high at the surface and marginal to sufficient at depth. There was no data available for exchangeable sodium.

Plant tissue tests were then taken on the 4th August from each treatment across the 3 reps. Potassium levels were found to be sufficient across all treatments, the results being displayed in Table 2 above. Nitrogen and Phosphorous were marginal at the 100kg/ha rate, while Manganese was high at the 50 & 100kg/ha rates.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0</th>
<th>25</th>
<th>50</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>K Levels</td>
<td>3.03</td>
<td>2.86</td>
<td>3.22</td>
<td>2.80</td>
</tr>
</tbody>
</table>

Grain yield was recorded on 10th December, and was found to increase with increasing rates of potash. This increase was significant between the rates of 0 & 100, and 25 & 100. Grain quality (protein, hectolitre weight and screenings) were recorded at the same time. Protein decreased significantly between most treatments, and weight came close to a significant increase between 0 & 100 when analysed with REML. There were no significant differences between any of the treatments in terms of screenings, although there was a decreasing trend.

The difference between the highest yielding treatment (100kg) and the lowest yielding treatment (0 & 25kg) is 0.16t/ha, which equates to *$33.60/ha (port equivalent).

*Values per hectare are calculated on the basis of $210.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.
Conclusions

This trial was designed to test the hypothesis that a cereal crop will respond to an application of potassium if subsoil K levels are marginal or low, even where they are adequate at the surface. On the reverse side of this, our aim was to determine whether a site low in K at the surface might not respond to applications of K if subsoil levels are adequate (>80ppm). The theory here is that the crop may be able to access enough potassium at depth to alleviate any surface deficiencies, and so render the application of K to the surface uneconomical in some situations.

Grain yield responded to increasing applications of potassium, as we expected it to on a paddock with low levels of K at both surface and subsoil. While not significant, the results from Curtis (barley only), Dixon and Gorfins wheat potassium trials show similar trends in yield (most notably between the 0 & 25kg rates), which suggests a response to K, and supports this result. However, the soil test results were very similar at both surface and depth (marginal - low), which means we are more likely to get a yield response, regardless.

In all trials, screenings showed a general trend towards decreasing as K levels increased. This indicates that Potassium has a direct effect on grain quality in cereals.

If this trial is to be repeated in 2005, we recommend soil samples be taken earlier (March), and the site be located where results are either high on the surface, and low at depth, or vice versa, to improve reliability of results. Where possible, trials should be conducted in an ‘average’ season to determine the requirements for additional applications of potassium.
Fungicide Application in Cereals

Impact vs Triad + Foliar Fungicide in Wheat – D Leake
Foliar Fungicide in Barley – K Leake
Impact vs Triad + Fungicide Trial Results

David Leake

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Allchera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety</td>
<td>Arrino</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Heavy duplex</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>JD 1810 airseeder with knife points</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>65kg/ha</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>29 May 2004</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>10 inch</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Agstar @ 80kg/ha, Flexi N @ 70L/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up Pmax @ 900ml/ha, Sprayseed @ 750ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>Nil, Impact (300ml/ha), Triad (200g/ha), Nil + Propiconazole (250ml/ha), Impact + Propiconazole (250ml/ha)</td>
</tr>
</tbody>
</table>

Results

Impact and Triad were sown down at seeding in strips the width of an airseeder. A nil treatment was included, and all 3 treatments were replicated 3 times. Heavy rains following sowing caused some seed to burst, resulting in thin spots across part of the trial. This was taken into account when final analysis was done. Propiconazole was then applied with a boom spray at 250ml/ha across the 2 middle reps (reps 2 & 3) on 29th August.

A disease rating was done on the third top leaf (F-3) on the 9th September. Generally speaking, there was more disease where a foliar fungicide was used in addition to a fungicide at seeding, which is the opposite of what we expected (but in keeping with last years data), however, there were no significant differences between any of the treatments. Leaf disease was then rated again on the flag leaf on the 27th September, at which time there was more disease present in the treatments that had no foliar fungicide applied post-em. Although the percentage of area affected varied less at this timing than it did on the 9th September, a significant difference occurred between the seeding treatments (treatments 1, 2 & 3).

Grain yield and quality were measured on the 10th December, and a significant difference was found amongst the seeding treatments for yield. Yield was lowest on the Nil + Nil treatments, and highest on the Impact + Propiconazole treatment. There was a definite increase in yield where Impact + Propiconazole were applied as compared to Nil + Nil at seeding, however, there was no difference between Nil + Nil and Nil + Propiconazole applied alone later in the season. In addition, there was no significant difference between any of the 3 late foliar applications. If we look at the 3 seeding treatments alone (Nil, Triad, Impact) we see that Impact produced the highest yield, while Nil produced the lowest. In terms of a combination of seed treatment and foliar spray, Impact + Propiconazole produced the highest yield, and Nil + Propiconazole the lowest. These results are in keeping with the results obtained in the same trial in the 2003 season.

Protein levels showed a significant trend towards being higher where Propiconazole was applied as a foliar treatment later in the season, while screenings were lower. Neither of these differences were significant, and the level of screenings was acceptable for all treatments. Hectolitre weight showed a trend towards being higher where Propiconazole was applied, however it is important to note that there were a lot missing values with this measurement, and the results could not be analysed.

The difference between the highest (Impact + Propiconazole) and lowest (Nil + Nil) yielding treatments is 0.2t/ha, which equates to *$42.00/ha (port equivalent).

*Values per hectare are calculated on the basis of $210.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.
Conclusions

This trial shows that using a pre-sowing fungicide gives you more grain yield at the end of the season. The plots that had Triad and Impact pre-sowing, produced higher grain yields than the plots that had no pre-sowing fungicide.

Even though there was relatively little leaf disease at the site, there was still a significant benefit in applying a pre-sowing fungicide, with Impact proving to be better than Triad in terms of final grain yield. In addition, there appears to be a benefit in applying a foliar fungicide later in the season, particularly where Impact was used up front, with leaf disease levels being lower on the plots that had both Impact and Propiconazole applied.

In addition, Propiconazole applied late produced higher protein levels when compared to treatments that had no late application of a foliar fungicide (with the exception of Nil + Impact), and lower screenings. The healthier plants (less disease) may have been able to take nutrients up better (including N), to produce higher protein levels.

With the exception of hectolitre weight, which was flawed, the results obtained in 2004 support the results from the same trial in 2003. We are therefore confident to say that applying Impact as a pre-sowing fungicide, in conjunction with Propiconazole as a foliar, will produce the greatest benefit in terms of grain yield. There is, therefore, no real need to continue with this trial in the future.
Foliar Fungicide in Barley Trial Results

K Leake

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Timbuctoo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety</td>
<td>Stirling</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Sandy loam / duplex</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Airseeder</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>50kg/ha</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>25 May 2004</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>10 inch</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Flexi N @ 50L, K-Till Plus, Sulphate of Ammonia, Epsom Salts, Potassium Nitrate @ 3kg/ha, MAPTeck @ 2.5kg/ha, Magnesium Sulphate @ 2.8kg/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up, Sprayseed, MCPA LVE, Logran, Lexone, Fastac</td>
</tr>
<tr>
<td>Treatments</td>
<td>Nil, T1 180, T1 360, T1 180 + T2 @ 180, T1 360 + T2 180</td>
</tr>
</tbody>
</table>

Results

Propiconazole, in the form of Tilt, was applied at the first timing (T1) on the 13\textsuperscript{th} July at 180ml/ha and 360ml/ha, and then again at T2 on the 28\textsuperscript{th} August at a further 180ml/ha. A disease rating was done on the flag and second top leaf (F-1) on the 27\textsuperscript{th} September. In both cases, disease levels fell as the rate of Propiconazole increased, however, only 3 treatments were measured, and the data could not be analysed. Unfortunately, the trial map we received did not show correct layout, which led to only part of the trial being sampled.

Grain yield and quality were measured, with no significant differences found between any of the treatments. Yield was lowest in the Nil treatment, and highest in the T1 @ 360 and T1 @ 180 + T2 @ 180 treatments. Protein was highest in the T1 @ 180 + T2 @ 180 treatment, and hectolitre weight highest with T1 @ 360. Screenings were lowest with T1 @ 360. Interestingly, at no time did the highest rate of 540ml/ha (T1 @ 360 + T2 @ 180) out-perform treatments totalling 360ml (T1 @ 360, and T1 @ 180 + T2 @ 180). However, it must be noted that there were difficulties analysing the results due to the varying number of replicates for each treatment. In addition, the application method meant that there was actually a 6\textsuperscript{th} treatment, which we were initially unaware of. Analyses of the 6 treatments indicated that all measurements were in fact significant between reps, which casts doubt on the validity of the results and analyses.

The difference between the highest and lowest yielding treatments is 0.33t/ha, which equates to *$71.61/ha (port equivalent). Most plots went malt (with the exception of a few of the nil plots), so a malt price has been used for the calculation below.

*Values per hectare are calculated on the basis f $217.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

Some interesting trends exist, however, the trial needs to be replicated in a statistically assessable manner before we can draw any real conclusions.

The results do, however, indicate that early spraying is more beneficial than a late spray. They also suggest that 2 split applications of a foliar fungicide have a positive effect on both yield and quality in barley in seasons like 2004. From a financial point of view, the improvement in quality (malt vs feed) gained as screenings decreased, more than covers the cost of application.

More trials are needed to investigate the timing issue, so we can decide whether it is better to spray before we see disease, or at Z31, as is currently recommended.
General Nutrition Trials

Foliar Boron in Canola - Dixon
Foliar Manganese in Lupins – Dixon
Foliar Manganese in Lupins – D Leake
Foliar Manganese in Wheat – Dixon
MAP & Epsom Salts in Wheat – K Leake
Magnesium Sulphate in Wheat – K Leake
Flexi N in Wheat – K Leake
Foliar Potassium in Wheat – K Leake
Canola Boron Trial Results

Scott & Ann Dixon

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Pdk B8 Saunders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety</td>
<td>300 TT</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Morrell sand over gravel</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Flexi-coil</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>9 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>15 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>3kg/ha</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Pre = Agstar Plus @ 70kg/ha + Flexi N @50L/ha, Post = Flexi N @ 30L/ha + NS:31 @ 100kg/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up @ 1.2L/ha, Atrazine @ 1.1kg/ha, Le Mat @ 150ml/ha, Chlorpyrifos @ 200ml/ha, Atrazine @ 300g/ha, Aramo @300ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>Nil, Be (boron applied early), Bl (boron applied late), Be + Bl (boron applied early &amp; late)</td>
</tr>
</tbody>
</table>

Results

Boron was sprayed at 1L/ha over plots 1, 2, 7, 8, 11 & 12 on the 13th June when the crop was at 15% flowering. A second application was applied over plots 2, 3, 6, 7, 10 & 11 on the 3rd of August, approximately 4 weeks later.

Grain yield and quality were measured at harvest. There were no significant differences in either yield or quality between any of the 4 treatments, except for admixture, where Be + Bl was significantly less than Be. Protein was up a fraction in the nil plots (although not significant), while moisture and oil content remained the same across all treatments.

The difference between the highest yielding treatment (Be) and the lowest yielding treatment (Nil) is 0.06t/ha, which equates to *$21.66/ha (port equivalent).*

*Values per hectare are calculated on the basis of $361.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

As in 2003, there was no response to an application of foliar boron in this trial. In 2003, we felt that good rains in August may have masked the results; the additional moisture making soil levels of Boron available to the plants as they formed grain. It was suggested that the trial be repeated in a season with a dry period in Spring, in the belief that if the topsoil dries out, an application of boron may be taken up by the leaf, and so be of some benefit. 2004 offered such a season, and yet there was no response at the end of the day.

We therefore conclude that an application of foliar Boron is unlikely to be economical in crops yielding less than 1t/ha (low to medium rainfall areas). There is probably no need to repeat this trial in the future.
Foliar Manganese in Lupins Results

S & A Dixon

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>New Ground H3</th>
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</thead>
<tbody>
<tr>
<td>Variety</td>
<td>Tanjil</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Gravelly morrel</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>18 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>25 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>80kg/ha</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Flexicoil</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Big Phos TE @ 80kg/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up Pmax @ 1.5L, Simagranz @ 1.1kg/ha, Atrazine @ 0.3kg/ha, Fusion @ 250g/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>Nil, Mn (Manganese @ 500ml/ha), Mn + B (Manganese @ 500ml/ha + Boron @ 1L/ha)</td>
</tr>
</tbody>
</table>

Results

Manganese and Boron were applied by boom across the site on the 15th of September, when the crop was at the 1-2 pod stage. On the 23rd September, the flowers aborted from these plots, however it did not seem to affect grain yield at the end of the season.

A visual rating was done on the 20th October, when the crop was at 80% leaf drop, to determine whether any of the treatments were having an effect on seed development. We collected and opened pods, and found the seed in the Nil treatment to be slightly smaller, with a higher percentage of split seed than seed in the other 2 treatments. Where Manganese was applied alone, the seed was larger than both the Nil and Mn + B treatments, and only 1 split seed could be found. Mn + B produced slightly smaller seed, but it was still bigger than the Nil plots. Seed was assessed again at harvest (% split seed, % sowable seed and seed weight were measured), and the results are listed below.

Grain yield was found to increase significantly between Nil & Mn, and Nil & Mn + B. Grain quality (protein, screenings, split seed, sowable seed and seed weight) were recorded at the same time. There was no significant difference between any of the treatments in terms of protein, although there was a slight downward trend as nutrients were applied. Nor were there any differences between treatments in terms of the percentage of split seed found. On the other hand, screenings and seed weight decreased significantly, and the percentage of large, sowable seed increased significantly, as nutrients were applied.

The difference between the highest yielding treatment (Mn) and the lowest yielding treatment (Nil) is 0.07t/ha, which equates to *$15.47/ha (port equivalent).

*Values per hectare are calculated on the basis of $221.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that lupin yield and quality (in particular screenings and % split seed) will respond to an application of Manganese. The results show that grain yield and the percentage of large, sowable seed increased, and that screenings went down, as expected, but seed weight also went down. In addition, there was more split seed where Manganese was applied, neither of which we expected with additional doses of either Mn or B.

The trial needs to be repeated in 2005, possibly with 2 rates of Manganese (500ml & 1L/ha) and no Boron, before a conclusion can be made.
Foliar Manganese in Lupins Results

D Leake

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Stans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety</td>
<td>Tanjil</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Sand over gravel</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>10 &amp; 20 inch alternatives</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>11 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>90kg/ha</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>JD 1810</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>Double Super @ 70kg/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up Pmax @ 0.8L, Simatox @ 1.1kg/ha, Atrazine @ 0.3kg/ha, Targa Bolt @ 40ml/ha, Aramo @ 225ml/ha, Brodal @ 95ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>No Mn, Plus Mn</td>
</tr>
</tbody>
</table>

Results

Manganese (Mantrac) was applied to the paddock at 500ml/ha, with 3 areas left untreated for comparison, on the 2nd of September.

Plant tissue was sampled on the 4th August, and found to be sufficient in Manganese, the 2 samples measuring 275.8 & 112.6mg/kg.

Grain yield and quality (protein, screenings, split seed, sowable seed and seed weight) were measured in late December. There was no significant difference between either treatment in either yield or quality, although there were some positive trends. Protein and seed weight increased slightly, and screenings and split seed decreased a fraction, as expected. However, yield and the percentage of sowable seed exhibited a downward trend when Manganese was applied.

The difference between the highest yielding treatment (No Mn) and the lowest yielding treatment (Plus Mn) is 0.26t/ha, which equates to *$57.46/ha (port equivalent).

*Values per hectare are calculated on the basis of $221.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that lupin yield and quality (in particular screenings and % split seed) will respond to an application of Manganese.

The trend was towards an improvement in quality, however grain yield and the number of large, sowable seeds decreased slightly, which was not what we expected. One possible explanation is that there were other growth limiting factors at the site (eg lack of rainfall in September). With the exception of screenings, the results appear to be the opposite of the results obtained at Dixons. However, it is important to remember that there were no significant differences in this trial, which means in reality, there were no responses to Mn at this site.

The trial needs to be repeated in 2005, possibly with 2 rates of Manganese (500ml & 1L/ha), before a conclusion can be drawn.
Foliar Manganese in Wheat Results

S & A Dixon

Site Details

Paddock: Newmans K4
Variety: Wyalkatchem
Soil Type: Gravelly loam
Row Spacing: 9 inch
Sowing Date: 20 May 2004
Seed Rate: 70kg/ha
Seeding Machine: Flexicoil
Fertiliser: Agstar Xtra @ 70kg/ha, Flexi N @ 100L/ha, Flexi N @ 40L/ha
Herbicide: R/up Pmax @ 1.2L, Trifluralin @ 1.5L/ha, Logran @ 35g/ha, Giant @ 300ml/ha, LVE MCPA @ 300ml/ha
Treatments: Mn @ 0L/ha, Mn @ 0.5L/ha, Mn @ 1L/ha

Results

Manganese (Mantrac) was applied 8 weeks after sowing, on the 22nd July, when the crop was at the 5 - 7 leaf stage.

Plant tissue was sampled on the 20th September, and found to be high in Manganese, with levels ranging from 80.2 - 197.8mg/kg.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 3rd December. There was no significant difference between any of the treatments in either yield or quality, although there were some positive trends. Grain yield increased slightly, and screenings decreased, as the rate of Manganese increased, as we expected it to. Protein and hectolitre weight appear to drop off as the rate increases beyond 500ml/ha, but in reality, there is no difference between the treatments.

The difference between the highest yielding treatment (Mn @ 1L/ha) and the lowest yielding treatment (Nil) is 0.24t/ha, which equates to *$45.84/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the hypothesis that yield and quality will respond to an application of Manganese. Manganese levels in the plant at sampling were high, suggesting a response, however, the result may be due to the late timing of sampling (we would normally expect the levels to be lower if sampled earlier at mid tillering).

The results suggest that grain yield increases and screenings decrease, as nutrients are applied, however, the absence of any significant differences means that in reality, there were no responses to Manganese at this site.

The trial needs to be repeated in 2005, possibly at 3 different sites, before a conclusion can be made.
MAP & Epsom Salts in Wheat Results

K Leake

Site Details

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Bagdad &amp; B Paddocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety</td>
<td>Carnamah</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Duplex</td>
</tr>
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<td>Row Spacing</td>
<td>10 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>21 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>70kg/ha</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Morris</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>K-Till Plus, Flexi N, MAP Tech, MgSO4</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up Pmax @ 1.0L, Trifluralin @ 1.5L/ha, Dual @ 600ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>No MAP, Plus Map (MAPTech @ 3kg/ha + Epsom Salts @ 2.5kg/ha)</td>
</tr>
</tbody>
</table>

Results

MAPTech + Epsom Salts were applied to both paddocks, with 2 areas in each paddock left untreated for comparison.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December, and the results were combined for analysis. There were no significant differences between any of the treatments in either yield or quality, and the small differences that did occur were contradicted by the results from the 2nd paddock (with the exception of protein, which decreased in both paddocks when MAP + Epsom Salts were applied). The CV% was in most cases, very large, indicating problems with the trial design.

The difference between the highest yielding (average of both paddocks) treatment (No MAP) and the lowest yielding treatment (Plus MAP) is 0.02t/ha, which equates to *$3.82/ha (port equivalent).*

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the effects of applying MAP + Epsom Salts on cereals. There were no significant differences between any of the treatments, and no trends to speak of.

More work is needed before a conclusion can be drawn as to whether an application of MAP + Epsom Salts is beneficial. If this trial is to be repeated in 2005, we recommend each site contain more replicates, so the final data is more reliable.
Magnesium Sulphate in Wheat Results

K Leake

Site Details

Paddock: Tambrey  
Variety: Carnamah  
Soil Type: Duplex  
Row Spacing: 10 inch  
Sowing Date: 19 May 2004  
Seed Rate: 70kg/ha  
Seeding Machine: Morris  
Fertiliser: K-Till Plus, Flexi N, Urea  
Herbicide: R/up, Trifluralin, Jaguar, Ally  
Treatments: No MgSO₄, Plus MgSO₄

Results

Magnesium Sulphate was applied to the paddock, with 3 areas left untreated for comparison.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between any of the treatments in either yield or quality, and the small differences that did occur, suggest that quality is poorer with the addition of MgSO₄ (with the exception of screenings). The CV% was in most cases, very large, indicating problems with the trial design.

The difference between the highest yielding treatment (Plus MgSO₄) and the lowest yielding treatment (No MgSO₄) is 0.06t/ha, which equates to $11.46/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the effects of applying Magnesium Sulphate on cereals. There were no significant differences between any of the treatments, and no trends to speak of.

More work is needed before a conclusion can be drawn as to whether an application of MgSO₄ is beneficial. If this trial is to be repeated in 2005, we recommend it be repeated on a number of sites, and that each site contain more replicates, so the final data is more reliable.
Magnesium Sulphate in Wheat Results

K Leake

Site Details

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddock</td>
<td>Tambrey</td>
</tr>
<tr>
<td>Variety</td>
<td>Carnamah</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Duplex</td>
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<tr>
<td>Row Spacing</td>
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<tr>
<td>Sowing Date</td>
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<tr>
<td>Seed Rate</td>
<td>70kg/ha</td>
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<tr>
<td>Seeding Machine</td>
<td>Morris</td>
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<tr>
<td>Fertiliser</td>
<td>K-Till Plus, Flexi N, Urea</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up, Trifluralin, Jaguar, Ally</td>
</tr>
<tr>
<td>Treatments</td>
<td>No MgSO₄, Plus MgSO₄</td>
</tr>
</tbody>
</table>

Results

Magnesium Sulphate was applied to the paddock, with 3 areas left untreated for comparison.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between any of the treatments in either yield or quality, and the small differences that did occur, suggest that quality is poorer with the addition of MgSO₄ (with the exception of screenings). The CV% was in most cases, very large, indicating problems with the trial design.

The difference between the highest yielding treatment (Plus MgSO₄) and the lowest yielding treatment (No MgSO₄) is 0.06t/ha, which equates to *$11.46/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the effects of applying Magnesium Sulphate on cereals. There were no significant differences between any of the treatments, and no trends to speak of.

More work is needed before a conclusion can be drawn as to whether an application of MgSO₄ is beneficial. If this trial is to be repeated in 2005, we recommend it be repeated on a number of sites, and that each site contain more replicates, so the final data is more reliable.
Flexi N in Wheat Results

K Leake

Site Details

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<tr>
<th>Paddock</th>
<th>Yardoo</th>
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<tbody>
<tr>
<td>Variety</td>
<td>Calingiri</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Duplex</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>10 inch</td>
</tr>
<tr>
<td>Sowing Date</td>
<td>19 May 2004</td>
</tr>
<tr>
<td>Seed Rate</td>
<td>70kg/ha</td>
</tr>
<tr>
<td>Seeding Machine</td>
<td>Morris</td>
</tr>
<tr>
<td>Fertiliser</td>
<td>K-Till Plus @ 90kg/ha, Urea @ 30kg/ha</td>
</tr>
<tr>
<td>Herbicide</td>
<td>R/up Pmax @ 1.0L, Trifluralin @ 1.5L/ha, Dual @ 600ml/ha</td>
</tr>
<tr>
<td>Treatments</td>
<td>No Flexi N, Plus Flexi N</td>
</tr>
</tbody>
</table>

Results

Flexi N was applied to the paddock, with 4 areas left untreated for comparison.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between any of the treatments in either yield or quality, and the small differences that did occur, suggest that both yield and quality are poorer with the addition of Flexi N (with the exception of hectolitre weight).

The difference between the highest yielding treatment (No Flexi N) and the lowest yielding treatment (Plus Flexi N) is 0.05t/ha, which equates to *$10.50/ha (port equivalent).*

*Values per hectare are calculated on the basis of $210.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was done to test the effects (in terms of yield and quality) of applying Flexi N to cereals. There were no significant differences between any of the treatments, and no trends to speak of.

More trials could be carried out, however, there has already been a lot of work done with Flexi N in the years since 1999 (CSBP, WANTFA etc), so it may be better to focus our effort elsewhere in 2005.
Foliar Potassium in Wheat Results

K Leake

Site Details

Paddock            Bagdad
Variety            Carnamah
Soil Type          Duplex
Row Spacing        10 inch
Sowing Date        21 May 2004
Seed Rate          70kg/ha
Seeding Machine    Morris
Fertiliser         K-Till Plus, Flexi N, MAPTech @ 3kg/ha, MgSO4 @ 2.5kg/ha
Herbicide          R/up, Trifluralin, Dual, Monza, Lontrel, Ally
Treatments         0kg Potassium Nitrate, 3kg Potassium Nitrate

Results

Potassium Nitrate was applied to the paddock, with 2 areas left untreated for comparison.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between any of the treatments in either yield or quality, and the small differences that did occur, suggest that yield and hectolitre weight decrease, while protein and screenings increase with the addition of Potassium Nitrate. The CV% was very large for yield and screenings, indicating problems with the trial design.

The difference between the highest yielding treatment (0kg) and the lowest yielding treatment (3kg) is 0.02t/ha, which equates to *$3.82/ha (port equivalent).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was designed to test the effects of applying Potassium Nitrate to cereals. There were no significant differences between any of the treatments, and no trends to speak of.

More work is needed before a conclusion can be drawn as to whether an application of Potassium Nitrate is beneficial. If this trial is to be repeated in 2005, we recommend it be repeated on a number of sites, and that each site contain more replicates, so the final data is more reliable.
Cross Sowing For Weed Control

Cross Sowing in Wheat – K Leake
Cross Sowing For Weed Control in Wheat Results

K Leake

Site Details

- **Paddock**: Tambrey
- **Variety**: Calingiri
- **Soil Type**: Duplex
- **Row Spacing**: 10 inch
- **Sowing Date**: 20 May 2004
- **Seed Rate**: 70kg/ha & 140kg/ha
- **Seeding Machine**: Morris
- **Fertiliser**: K-Till Plus @ 90kg/ha, Urea @ 30kg/ha
- **Herbicide**: R/up Pmax @ 1.0L, Trifluralin @ 1.5L/ha, Dual @ 600ml/ha
- **Treatments**: S70, S140, D70, D140 (indicating single or double sown + rate)

Results

The trial was sown in an EW direction using 2 different seeding rates (70 & 140kg). Reps 1 & 2 were then cross sown in a NS direction as a comparison.

Plant and weed density (ryegrass) counts were done on the 9th July. Plant numbers increased significantly with increasing seeding rate, as we would expect. Weed density remained the same across the treatments.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between any of the treatments in either yield or quality, except with screenings, which increased significantly with increasing plant density. There were, however, some interesting trends. Grain yield appeared to decrease slightly until D70, after which it increased, while hectolitre weight increased slightly as plant density increased. There was no difference in regards to protein.

The difference between the highest yielding treatment (S70) and the lowest yielding treatment (D70) is 0.12t/ha, which equates to *$25.20/ha (port equivalent).*

*Values per hectare are calculated on the basis of $210.00 per tonne port equivalent (10 year average). For nett on farm price, subtract approximately $15 per tonne.*

Conclusions

This trial was designed to test the hypothesis that high seeding rates and/or cross sowing will increase the crops ability to compete with weeds (namely ryegrass). At the same time, we aimed to determine at what point plant density begins to have a negative impact on yield and quality (eg screenings). Unfortunately, the only significant difference was with increasing screenings, as expected, although there was a slight trend towards a decrease in yield, also expected with higher plant populations.

Ideally, weed numbers should have decreased with increasing seeding rate. This did not occur, however, a visual rating of vigour and size on the day of measurement, indicates that ryegrass plants were bigger (better tillered) in the treatment with the lowest seeding rate (S70). This is a positive sign, and indicates that additional trial work may be of interest.

More work is needed before a conclusion can be drawn as to whether cross sowing might provide a valid weed control option in cereals.
Calingiri vs Carnamah Wheat Results

K Leake

Site Details

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>Treatments</td>
<td>Carnamah, Calingiri (variety comparison)</td>
</tr>
</tbody>
</table>

Results

Calingiri was sown around the outside edge of the paddock, and 3 strips were cut as a comparison to Carnamah when the MgSO4 trial was harvested.

Grain yield and quality (protein, hectolitre weight and screenings) were measured on the 13th December. There were no significant differences between either treatment in terms of yield or quality, although the small differences that did occur suggest that Calingiri has a tendency towards higher protein and screenings than Carnamah. The CV% was very large for yield and screenings, indicating problems with the trial design.

The difference between the highest yielding treatment (Calingiri) and the lowest yielding treatment (Carnamah) is 0.06t/ha. At the yields obtained, Carnamah would return $454.58/ha, and Calingiri $501.90 (at the 10 year average prices listed below).

*Values per hectare are calculated on the basis of $191.00 per tonne port equivalent (10 year average) for Carnamah, and $210.00 per tonne port equivalent (10 year average) for Calingiri. For nett on farm price, subtract approximately $15 per tonne.

Conclusions

This trial was simply a 'look & see' comparison. There were no significant differences between either treatment, and no trends to speak of. There is probably no need to repeat this work in 2005, given that there has been plenty of wheat variety comparison work done in the past (AgWA etc).