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# NSW research results

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# Effect of macro and micro nutrients on yield and protein in wheat – Coonamble 2013

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## Introduction

Growers have repeatedly sought information on the use of trace elements and whether there are responses to any on the vertosol soils.

The methodology for this trial was to give a one-off application of 8 foliar trace elements as chelates and take one away e.g. All nutrients *minus* boron or all nutrients *minus* copper.

## Site details

**2013**

| | |
|---|---|
| Location: | **Coonamble Black vertosol** |
| Co-operator: | **"Narratigah"** |
| Wheat Variety: | **EGA_Gregory(ϕ) @ 100 seeds/m²** |
| Sowing date: | **6th May** |
| Nitrogen application: | **21st May topdress 100 kg/ha Urea** |
| Phosphorous application: | **100 kg/ha triple super at sowing** |
| Foliar application date: | **15 August 2013 GS Z31** |
| Paddock history: | **Long fallowed from sorghum.** |
| Comments: | **A dry year with a tight finish. Yield losses from excluding some treatments occurred even in a water limited year. The crop was fresh at time of foliar application. Neither root nor foliar diseases were visibly present throughout the growing season in this trial.** |

## Treatments

As this was a nutrient exclusion trial the treatments listed are for example Calcium (Ca) means all nutrients were applied *except* for Calcium and so on.

The major element Phosphorous (P) was applied as triple super at 20 kg/haP i.e. 90 kg/ha at sowing.

The major element Nitrogen (N) was applied as top-dressed urea two weeks after sowing at 100 kg/ha urea (46 kg/ha N).

The trace elements Boron (Bo), Calcium (Ca), Copper (Cu), Iron (Fe), Potassium (K), Magnesium (Mg), Manganese (Mn), and Zinc (Zn) were all applied in the chelated form as foliar sprays at growth stage Z32 as individual nutrients in multiple passes.

### Key findings

There was a significant response from applying all nutrients above Nil (0.39 t/ha).

The greatest yield and protein losses were incurred where no Nitrogen (N) was applied (–0.73 t/ha).

Yield losses occurred also where any other nutrient was excluded with some being statistically significant – Calcium, Iron, Potassium, Magnesium, Phosphorus.

## Results

***Table 1.*** *Results for yield and protein at Coonamble in 2013*

| Nutrient | Yield (t/ha) | Protein % |
|---|---|---|
| All Applied | 2.96 | 11.97 |
| Minus Ca | 2.63 | 11.97 |
| Minus Cu | 2.76 | 11.77 |
| Minus Fe | 2.61 | 11.92 |
| Minus K | 2.59 | 11.93 |
| Minus Mg | 2.50 | 11.7 |
| Minus Mn | 2.72 | 11.76 |
| Minus N | 2.23 | 10.83 |
| Nil fert | 2.57 | 10.89 |
| Minus P | 2.63 | 11.86 |
| Minus Bo | 2.81 | 11.9 |
| Minus Zn | 2.85 | 11.99 |
| LSD | 0.29 | 0.36 |
| CV % | 9.8 | 2.7 |
| Site Mean | 2.65 | 11.7 |



## Summary

Nil nitrogen produced the greatest effect on yield with a reduction of 0.73 t/ha. It is likely that N was the major limiting nutrient; however the removal of several other trace elements also caused reductions in yield which were statistically significant.

Excluding every other trace element saw a reduction in yield below the 'All treatment. Those nutrients which caused statistically significant yield losses when excluded are:- Ca; Fe, K; Mg; N; Nil fert; P.

Yields and proteins were average for this season.

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