

Investigation of Zinc Application Options

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LOCATION

Ceduna
Bill Sleep
Charra Ag. Bureau
Penong
Jim Snow
Far West Top Crop

RAINFALL

Charra - Av. Annual Total:
310 mm
Bookabie - Av. Annual Total:
277 mm
Charra Av. Growing Season:
240 mm
Bookabie Av. Growing Season:
209 mm

PADDOCK HISTORY

1997: pasture

SOIL

Charra: red calcareous loam
Bookabie: grey calcareous
sandy loam

PLOT SIZE

Charra: 10m 200m
Bookabie: 15m x 200m

REPLICATES

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Why do the trial?

Interest in alternative zinc nutrition products and application methods has increased dramatically in low rainfall areas.

Replicated plot trials on Eyre Peninsula have shown few consistent yield benefits result from the use of zinc seed dressings in most soil types, but many producers consistently claim yield benefits when some of these products are used in broadacre situations.

Two broadacre demonstrations were placed on different soil types west of Ceduna in 1998. A range of zinc application methods and products were demonstrated.

How was it done?

Trial Details -

CHARRA: Five broadacre plots were pegged in a paddock with no previous history of zinc application.

A soil spray of zinc sulphate was applied in March and incorporated when the paddock was worked up prior to seeding. All plots

application rates were the same. Krichauff wheat was sown at 62kg/ha.

Measurements -

YEB's were sampled at the 4-leaf stage and analysed for zinc content. Treatments containing foliar zinc were not tissue tested as inflated values generally result in the weeks immediately after application. Yield was measured using a grain weighing trailer and grain quality was tested at SACBH facilities.

What happened?

Results at the Charra site reflected the results obtained in small plot trials on E.P.

The zinc soil spray, zinc granular fertiliser and zinc seed coat all lifted tissue levels of zinc early in the plants life above those of the nil zinc plot (Table 1).

Yield differences were, however, too small for differences to be attributed to the use of zinc, regardless of the application method.

Results from Bookabie also reflect small plot work over the past 5 years. Soil applied zinc worked in by cultivation, granular zinc fertiliser applied at seeding and a seed coat of zinc were all able to supply additional zinc to the plant early in its life (Table 2).

There was no relationship with tissue zinc content and final yield. The soil spray of zinc in this demonstration was worked once prior to sowing to incorporate the zinc.

This extra working may have resulted in greater yield due to factors such as weed control or disease management.

received a basal fertiliser treatment of 50kg/ha of 18:20 except for the "zinc super" plot which was treated with 15:17 4% Zn at 65kg/ha to keep N and P inputs relatively constant at 9 units /ha and 10 units/ha.

All plots were sown to Excalibur wheat in May and sprayed for broadleaf weeds in August. Foliar application of zinc took place when the crop was at the 5-leaf stage.

BOOKABIE: Eight demonstration plots were sown in a paddock with no previous zinc history. Many of the treatments replicated those in the Charra trial and fertiliser

Table 1. Charra Zinc Demonstration 1998

	Kg Zn / ha	Cost of Zinc/ha (1998 Prices)	Tissue Levels Zinc @ 4 leaf	Wheat Yields and protein	Gross return/ha minus Zinc cost
Soil Spray Zinc Sulphate @ 10 kg/ha + 50 kg/ha 18:20	2.5	\$7.50	37 ppm	1.2 t/ha @ 12.3%	\$189.90
Seed Coat Broadacre Zinc® + 50 kg/ha 18:20	0.18	\$3.50	23 ppm	1.19 t/ha @ 12.2%	\$192.16
15:17 4 % Zn @ 60 kg/ha + 2l/ha Zincsol® Foliar spray @ 2l/ha	2.4 + 0.33	\$11.00	23 ppm - tested prior to foliar spray	1.1 t/ha @ 12%	\$179.30
18:20 @ 50 kg/ha + Zincsol® Foliar Spray @ 2l/ha	0.33	\$2.80	N/A	1.2 t/ha @ 11.9%	\$195.00
18:20 @ 50 kg/ha	0		19 ppm	1.17 t/ha @ 11.8%	\$189.54

Table 2. Bookabie Zinc Demonstration 1998

	Kg Zn/ha	Cost of Zinc/ha (1998 Prices)	Tissue Levels Zinc @ 4 leaf	Wheat Yields and protein	Gross return/ha minus Zinc cost
Soil Spray Zinc Sulphate @ 10kg/ha + 50kg/ha 18:20	2.5	\$7.50	21ppm	0.62/ha @ 12.4%	\$94.80
Soil Spray Zinc Sulphate @ 10kg/ha + Zincsol® Foliar Spray @ 2l/ha	2.5+ 0.33	\$10.30	N/A	0.55 t/ha @ 12.6%	\$81.00
Seed Coat Broadacre Zinc® + 50kg/ha 18:20	0.18	\$3.50	25ppm	0.39 t/ha @ 12%	\$60.07
Seed Coat Broadacre Zinc® + 50kg/ha 18:20 + Zincsol® Foliar Spray @ 2l/ha	0.18+ 0.33	\$6.30	N/A	0.52 t/ha @ 12.1%	\$78.72
15:17 4%Zn @ 60kg/ha	2.4	\$8.20	28ppm	0.32 t/ha @ 12.7%	\$44.58
15:17 4%Zn @ 60kg/ha + 2l/ha Zincsol® Foliar spray @ 2l/ha	2.4	\$11.00	N/A	0.35 t/ha @ 12.5%	\$46.93
18:20 @ 50kg/ha + Zincsol® Foliar Spray @ 2l/ha	0.33	\$2.80	N/A	0.39 t/ha @ 12.5%	\$61.75
18:20 @ 50kg/ha	0	Nil	20ppm	0.32 t/ha @ 12.6%	\$53.12

What does this mean ?

- Early zinc uptake by wheat plants can be increased when seed applied zinc products, zinc soil sprays or granular zinc fertilisers are used. However, early zinc uptake does not always result in increased yields, even when soil zinc availability is in the marginal-adequate range.
- The various zinc products on the market differ dramatically in price per kg of elemental zinc. Carefully consider your choice of zinc product for best value for money and ensure the method of application adequately fits your farming system (eg if you are into no-till, a soil spray of zinc would be of little benefit because the zinc would take years to be incorporated into the root zone of the plant; or, if you have zinc deficient soil, yield losses have occurred before sufficient leaf area exists for foliar spraying).
- All zinc products included in the demonstrations can

have a role in managing zinc nutrition. Some products have short term benefits, eg seed coats and foliar sprays, while others have longer term benefits that can be realised over several seasons. Good nutrition management suggests that it is usually best to address the underlying deficiency first through the adoption of proven long term strategies, then experiment with other products to see if they have a profitable role in your system.

See previous Harvest Report Books for more information on detailed micro nutrient seed coat trials or contact Andy Bates, PIRSA Streaky Bay, Brenton Growden, SARDI Pt Lincoln or Nigel Wilhelm, SARDI WAITE.

Acknowledgments

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Would you like to talk to the researchers about their work ?

Eyre Peninsula Agricultural Research and Technology Expo

April 4th 2000
Wudinna Telecentre

Watch the local media for details.

