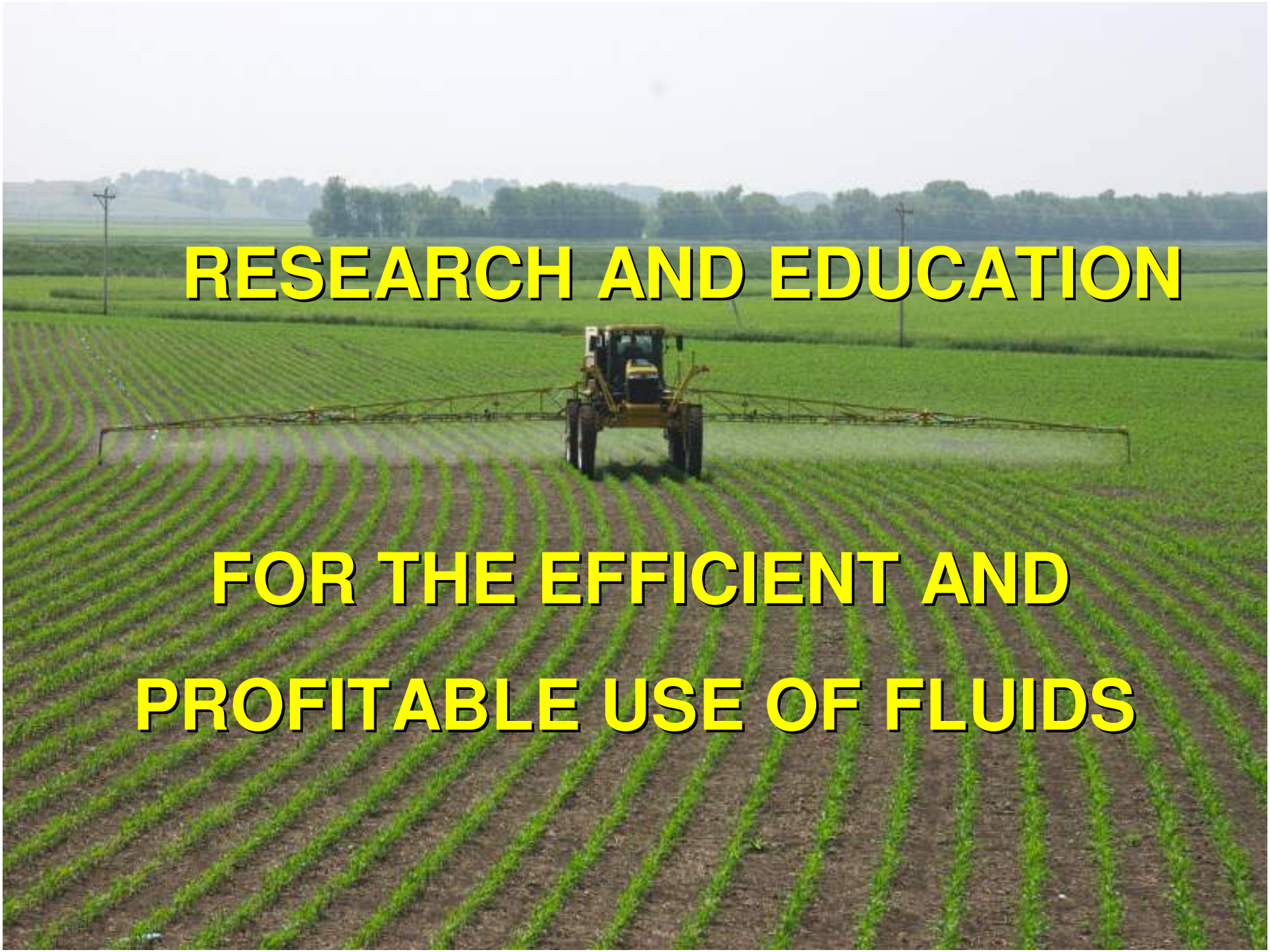
Advancing Agriculture Through Research & Education

FLUID FERTILIZER FOUNDATION

25 YEARS OF PROGRESS

1982-2007


RESEARCH AND EDUCATION
FOR THE EFFICIENT AND
PROFITABLE USE OF FLUIDS

WHAT IS THE FLUID FERTILIZER FOUNDATION (FFF)?

- The research and education arm of the fluid industry, a tax deductible Foundation.
- Founded in 1982 by the National Fertilizer Solutions Association.
- Supported entirely by dealers, distributors and manufacturers of fluid fertilizers and equipment.
- No employees.
- Run by and for the industry.
- The driving force in fluid market development.

WHAT FFF DOES

- The only industry organization providing educational programs exclusively in support of fluid marketing, agronomics and technology.
- Provides direct support for applied research with fluid fertilizers.
- Publishes the quarterly “Fluid Journal”, taking information directly to dealers.

WHAT FFF DOES

- Archives information on fluid formulation procedures.
- Publishes the Fluid Manual, the authority on fluid fertilizers.
- Provides sales support information directly to the industry through the Foundation website www.fluidfertilizer.com
- Organizes and presents the annual Fluid Forum, an annual review of all FFF research projects and topics of broad interest to the industry.

RESEARCH AND EDUCATION COMMITTEE

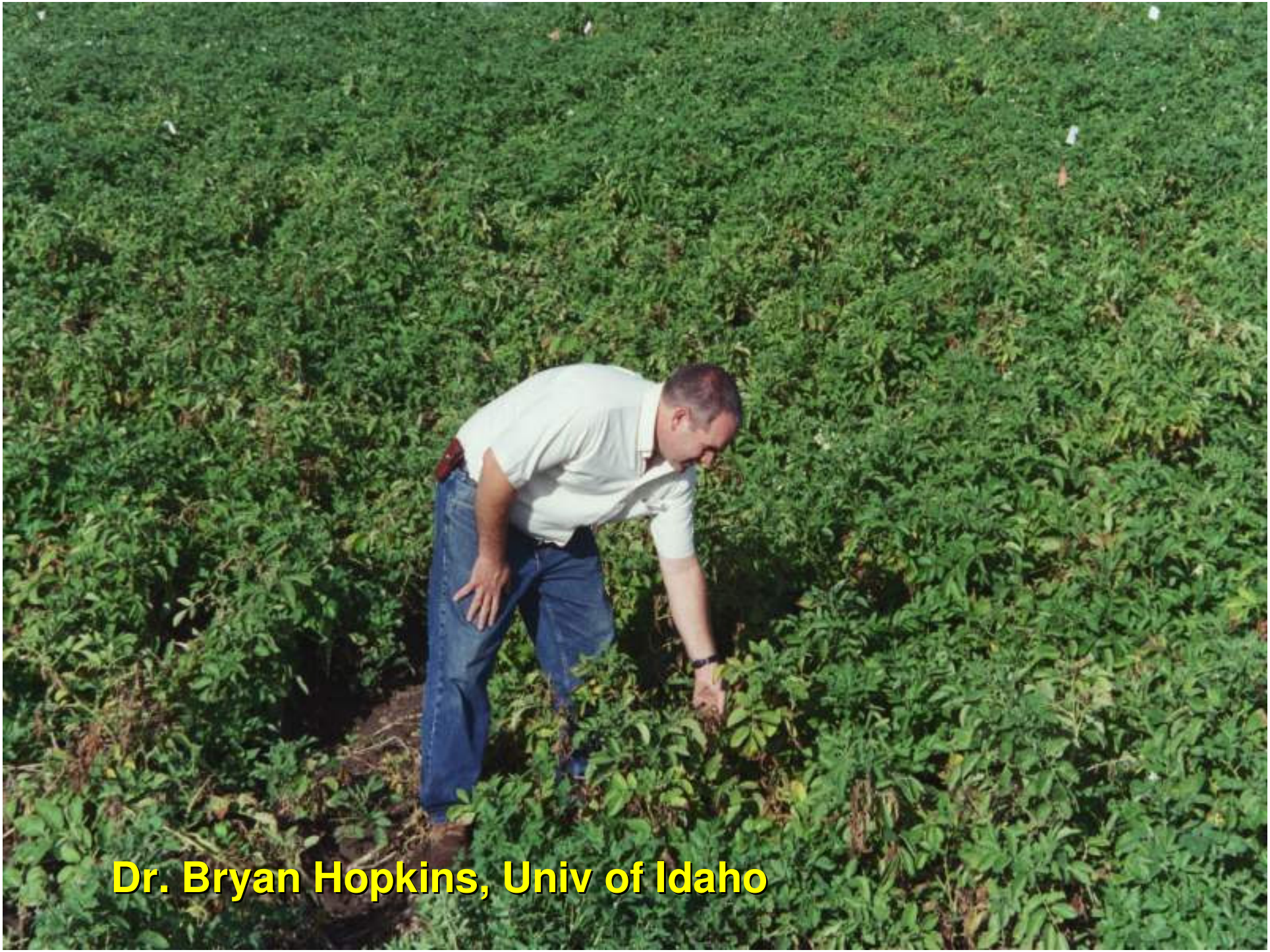
- Recommends all research and education projects to Board
- A unique resource for the industry, all industry personnel
- Plans Fluid Forum, Fluid Schools, Fluid Roundup programs

THE PRODUCTIVITY OF THE FOUNDATION

OUR PROJECT LEADERS!

PROJECTS IN CANADA,
AUSTRALIA, USA, MEXICO, ENGLAND
The future: Brazil? Argentina? Germany?


Dr. Cynthia Grant, Ag Canada

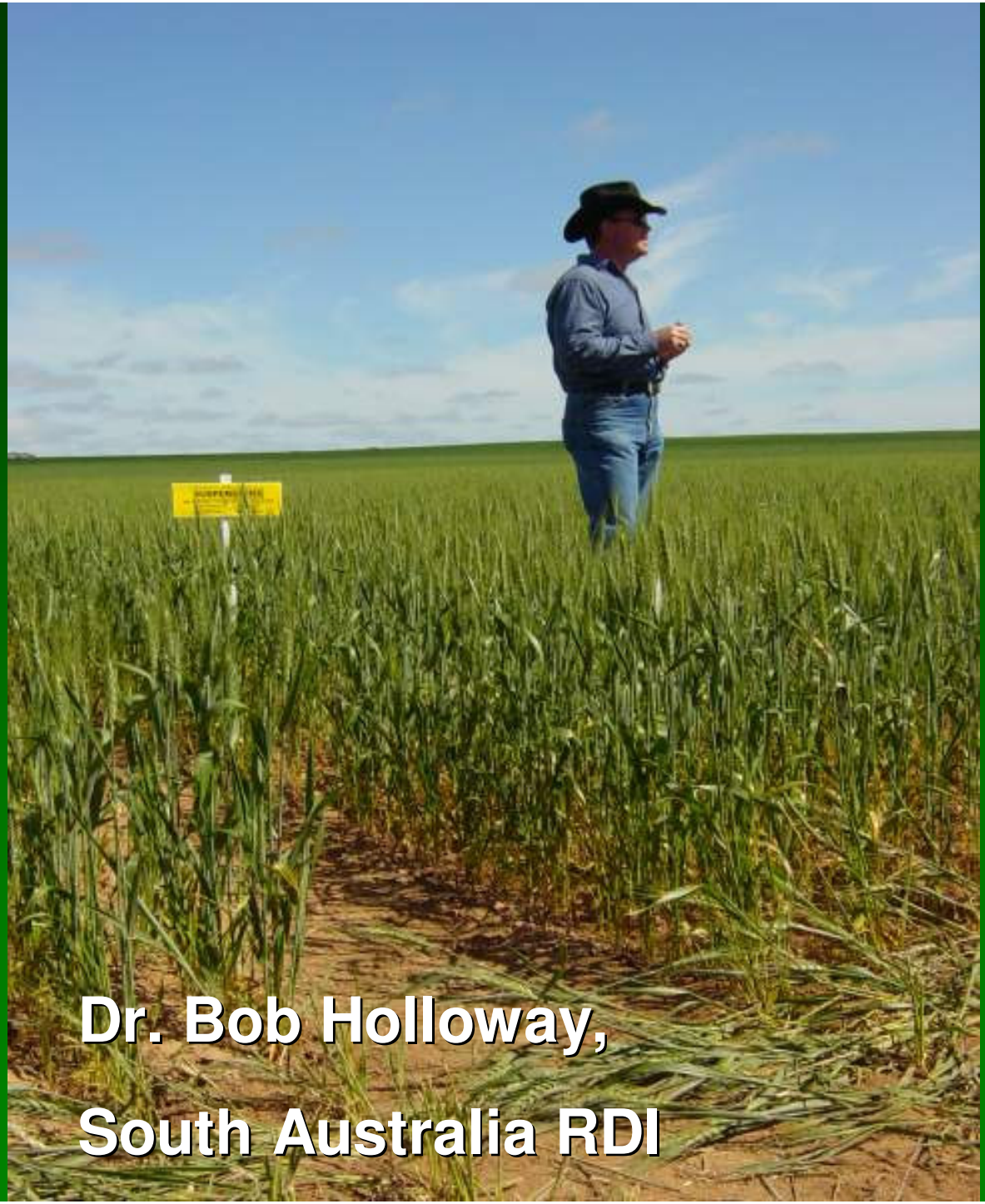

Dr. Bryan Hopkins, Univ of Idaho


Dr. Mark Alley, Virginia Tech Univ;


Dr. Ardell Halvorson, USDA-ARS

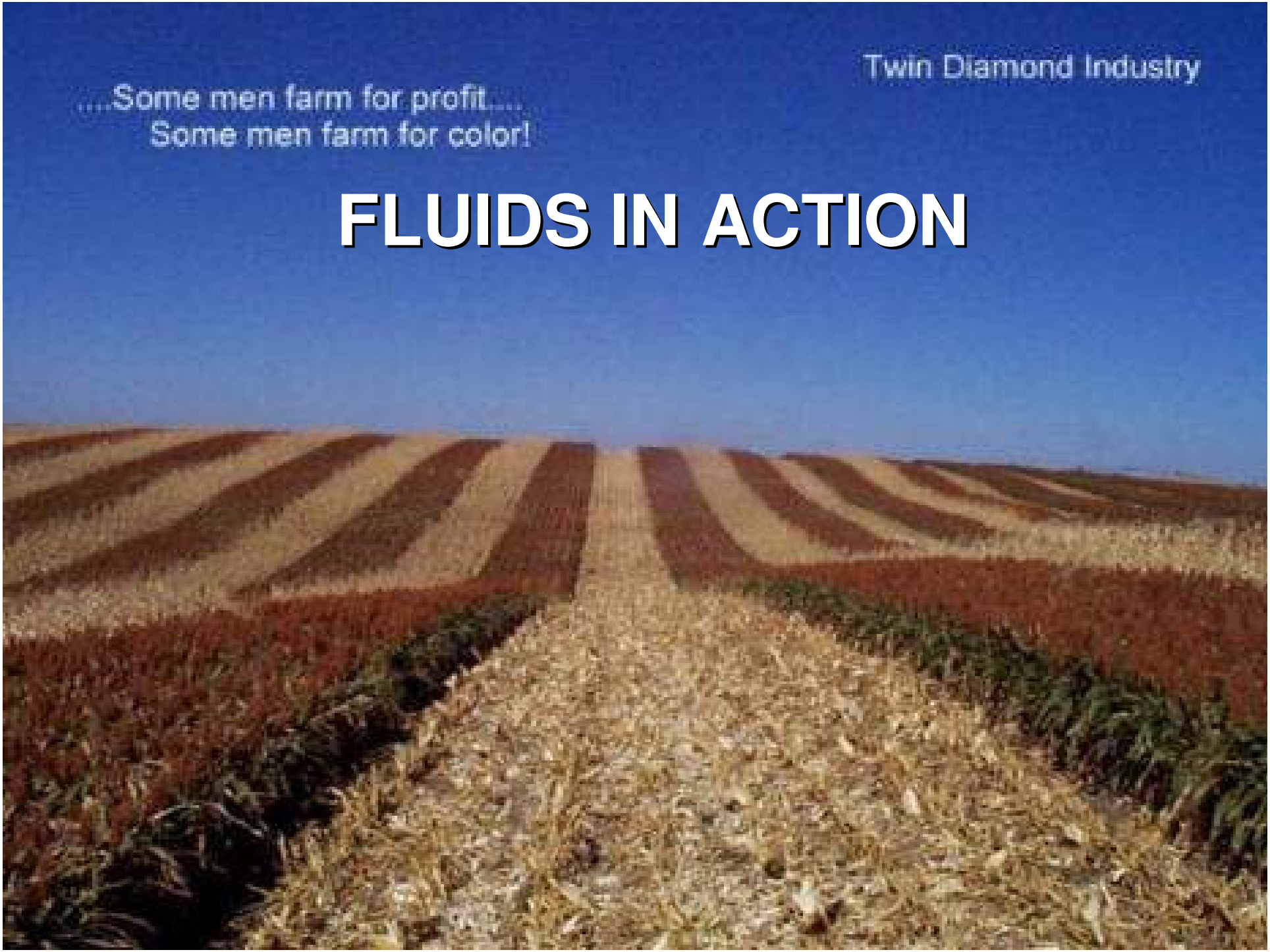

Dr. Jay Goos
North Dakota State Univ


3
Dr. John Jifon
Texas A&M Univ.


Dr. Bob Holloway,
South Australia RDI


Dr. Barney Gordon, Kansas State Univ.

RESEARCH IN ACTION


Twin Diamond Industry
....Some men farm for profit....
Some men farm for color!
FLUIDS IN ACTION

FFF EDUCATIONAL PROGRAMS

Fluid Journal ***…the flagship of FFF***

…articles written for direct use by dealers with their customers

57th issue on the way

FFF Website ***www.fluidfertilizer.com***

…a tremendous resource, download FJ articles, order materials

FFF EDUCATIONAL PROGRAMS

Unique in the Industry

Fluid Fertilizer Schools

16 since 2001, mainly agronomics, some technology, more requested

Fluid Technology Roundup

2005, 2006, Dec. 10-12, 2007

Mainly fluid technology, some agronomy..very popular

FFF EDUCATIONAL PROGRAMS

- Educational projects

Fluid Banding Review – a broad review of fluid banding. Source of articles, future publications

Fluid Programs for Individual Crops – Best Management Practices for fluid use in crop production, referenced

LOOKING AHEAD
The Next 25 Years

- **Research and education needs remain**
- **Opportunities:**
  - ***Improved nutrient use efficiency***
  - ***Greater returns on investments***
  - ***Training industry personnel***
  - ***Distribution of information***
- **Challenges:**
  - ***Continuing industry consolidation***
  - ***Continuing erosion of applied research support***
  - ***Training of students in applied agronomic sciences***

Reduced tillage – New emphasis on starters

MANY FACTORS INFLUENCE CROP RESPONSES TO STARTERS BESIDES SOIL TEST VALUES

Large amounts of residues

Cold soils

Compaction

Genetics

IN HIGH RESIDUE SYSTEMS, USE OF STARTER SHOULD BE A MANAGEMENT DECISION, UP FRONT, REGARDLESS OF SOIL TEST VALUES


FLUID STARTER
POLYMER A
NO POLYMER
2X2

NPKS Starter Fertilizer Rates and Placement for Corn

Gyles Randall and Jeff Vetsch
Southern Research and Outreach Center
Univ. of Minnesota
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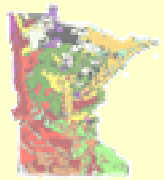
NPKS Starter Fertilizers

- Objectives:
  - Determine the effect of various combinations and rates of N, P, K, and S starter fertilizers on corn production and profitability on high P and K testing soils.
  - Evaluate starter placement positions for NPKS fluid fertilizers for corn.



Experimental Procedures

- Location: SROC, Waseca
- Soil type: 2004 – Nicollet clay loam
  2005 – Nicollet / Webster
- STP: Bray P_1 (ppm): 2004 – 28 (VH)
  2005 – 26 (VH)
  2006 – 19 (H)
- Planting date: 2004 – May 4
  2005 – May 3
  2005 – April 27

NPKS sources

Nutrient	Sources
N	UAN, plus
P_2O_5	10-34-0, 7-21-7
K_2O	KTS, 0-0-25-17
S	ATS, 12-0-0-26

Placements

1. None
2. Pop-up (in-row, with seed)
3. 5 x 5 (inject 5 cm deep and 5 cm from seed)
4. 5 x 0 (dribble on soil surface 5 cm from seed row)

NPKS starter and placement effects on corn grain yield (MN, 2006)

NPKS Rate	Placement	
	2 x 0”	2 x 2”
lb/A	------ Bu/A ------	
0+0+0+0	209	
6+20+0+0, pop-up	215	
6+20+6+4, pop-up	215	
20+20+6+4	233	221
20+20+0+4	216	229
20+20+6+0	206	208
20+20+10+10	231	224
40+40+10+10	226	---
LSD (0.10):	12	

NPKS Summary

Effects of NPKS starter PLACEMENT on yield.

Fluid NPKS Placement[1/]	3-Yr Avg. Corn Yield
	bu/A
2” x 0”	196
2” x 2”	195
LSD (0.10) =	NS

[1/] Averaged across 4 NPKS rates of application.

NPKS Summary

- Early growth (V6) was increased by the starter treatments in all years. 3-Yr average weight responses ranged from about 35% for the 2” x 0” and 2” x 2” placements to about 70% for “pop-up” placement.
- Concentrations of N, P and K in the small plants were generally NOT affected by the starter rates and placements.
- Sulfur concentrations were affected by the starter rates but were not affected by placement.
- N, P, K and S uptake was increased by starter rate but was not affected by placement.

NPKS Summary

- Grain yield was significantly increased above the no starter control by all NPKS starter treatments except those that did NOT contain S and the 6 + 20 + 6 + 4 “pop-up” placement
  - 30% stand reduction one year

- Applying higher rates of N and P (40 + 40 vs. 20 + 20) did not increase grain yield or profitability

NPKS CONCLUSIONS

- Low amounts of fluid NPKS starter fertilizers gave consistent economic corn yield responses on these HIGH P-testing soils.
- Starter fertilizer placement (2x2” or 2x0”) did not affect yield response.
- Sulfur included in the starter consistently increased corn yield.

FLUID FERTILIZER FOUNDATION

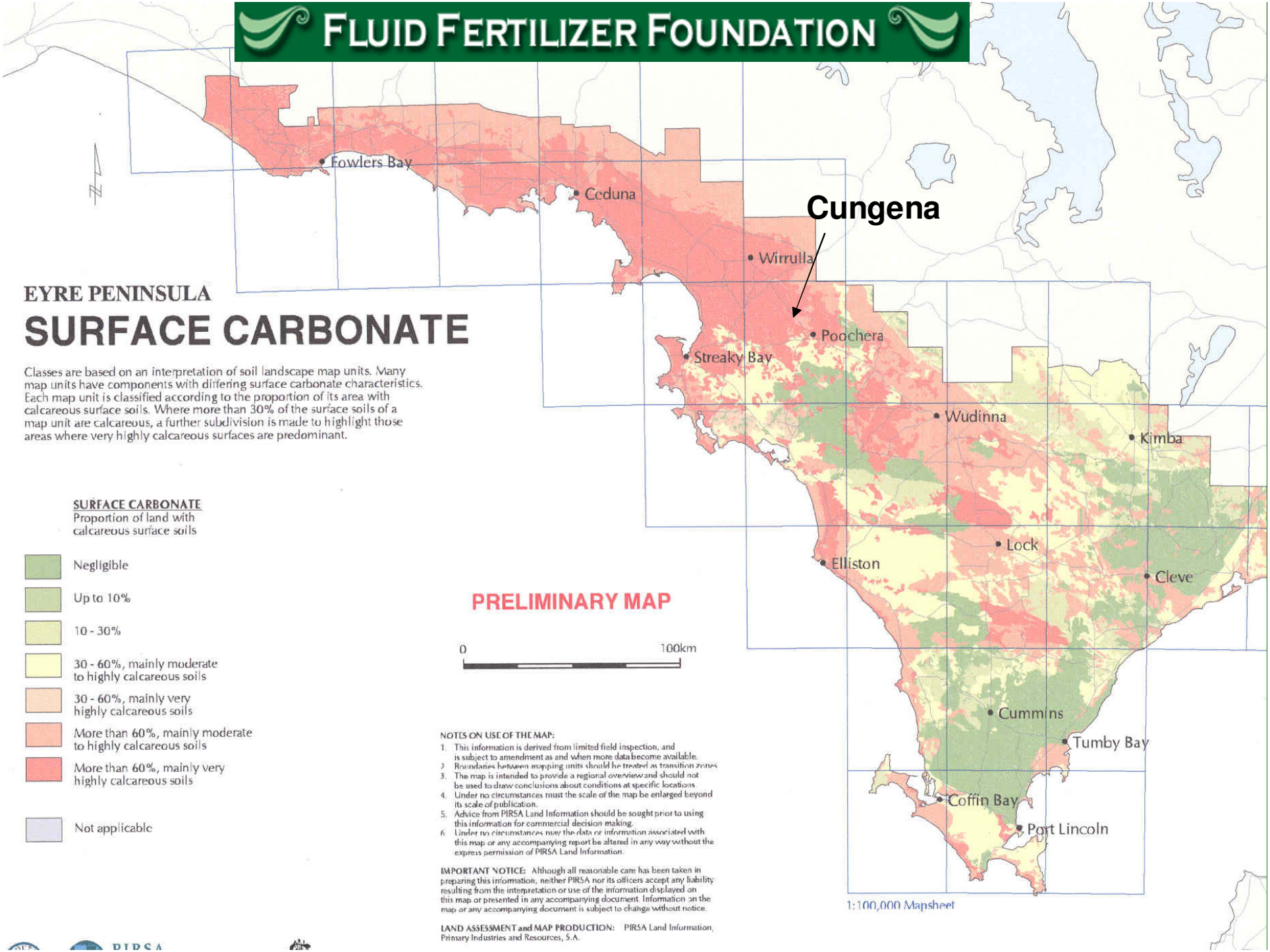
Improving Micronutrient Efficiency and Availability with Fluid Fertilisers

Bob Holloway
Dot Brace
Ian Richter

Ganga Hettiarachchi
Mike McLaughlin
Thérèse McBeath
Enzo Lombi
Caroline Johnston

Roger Armstrong

State Government Victoria Department of Natural Resources and Environment



EYRE PENINSULA

SURFACE CARBONATE

Classes are based on an interpretation of soil landscape map units. Many map units have components with differing surface carbonate characteristics. Each map unit is classified according to the proportion of its area with calcareous surface soils. Where more than 30% of the surface soils of a map unit are calcareous, a further subdivision is made to highlight those areas where very highly calcareous surfaces are predominant.

SURFACE CARBONATE
Proportion of land with calcareous surface soils

- Negligible
- Up to 10%
- 10 - 30%
- 30 - 60%, mainly moderate to highly calcareous soils
- 30 - 60%, mainly very highly calcareous soils
- More than 60%, mainly moderate to highly calcareous soils
- More than 60%, mainly very highly calcareous soils
- Not applicable

PRELIMINARY MAP

0 100km

NOTES ON USE OF THE MAP:

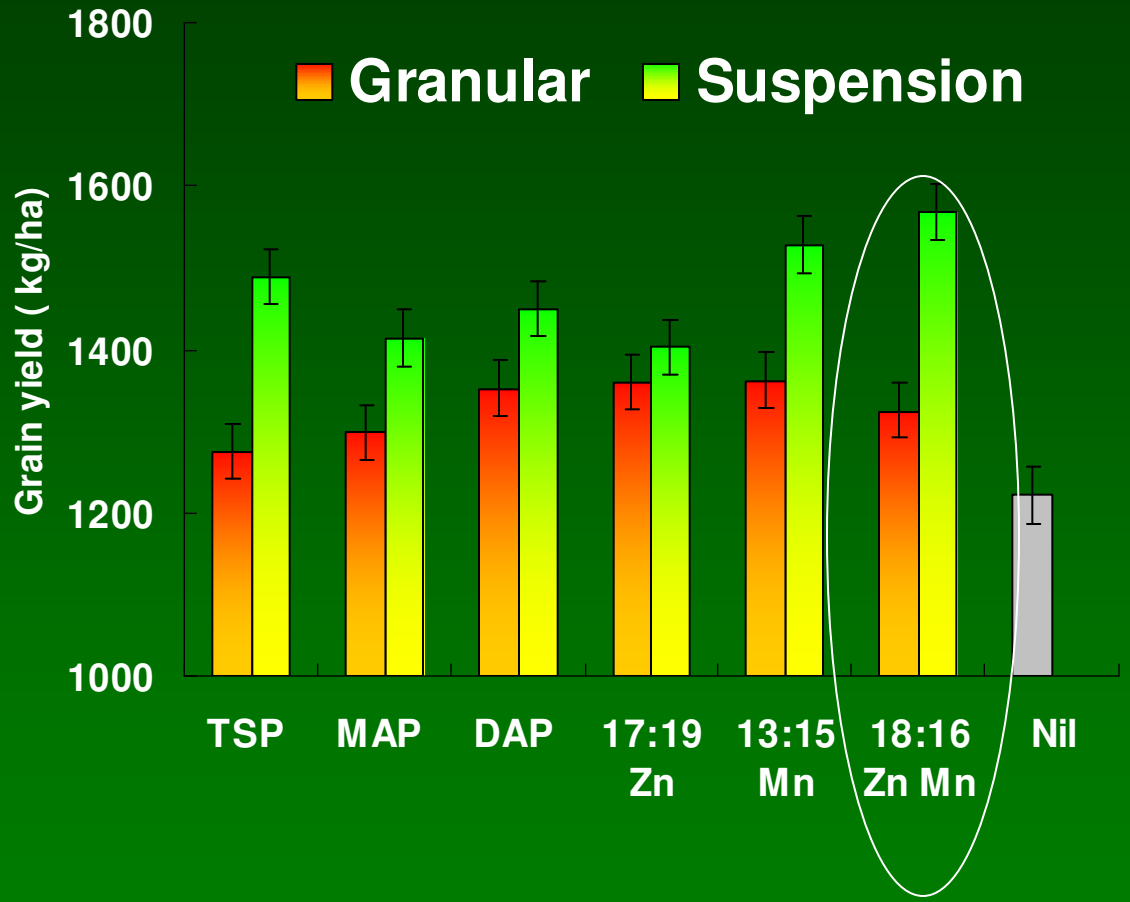
1. This information is derived from limited field inspection, and is subject to amendment as and when more data become available.
2. Boundaries between mapping units should be treated as transition zones.
3. The map is intended to provide a regional overview and should not be used to draw conclusions about conditions at specific locations.
4. Under no circumstances must the scale of the map be enlarged beyond its scale of publication.
5. Advice from PIRSA Land Information should be sought prior to using this information for commercial decision making.
6. Under no circumstances may the data or information associated with this map or any accompanying report be altered in any way without the express permission of PIRSA Land Information.

IMPORTANT NOTICE: Although all reasonable care has been taken in preparing this information, neither PIRSA nor its officers accept any liability resulting from the interpretation or use of the information displayed on this map or presented in any accompanying document. Information on the map or any accompanying document is subject to change without notice.

LAND ASSESSMENT and MAP PRODUCTION: PIRSA Land Information, Primary Industries and Resources, S.A.

PIRSA

CUNGENA 2004



Micronutrient Trial 2005

- 2 sites

CUNGENA

Grey highly calcareous sandy loam

Calcium carbonate 35%

GSR 234 mm

PORT KENNY

Grey highly calcareous sandy loam

Calcium carbonate 54%

GSR 351 mm

Site	N	P	Zn	Mn
CUNGENA	**15**	**10**	**1**	**2.5**
PORT KENNY	**25**	**10**	**1**	**2.5**

- **All suspensions were made using DAP based granular products mixed with clay & sulphuric acid**

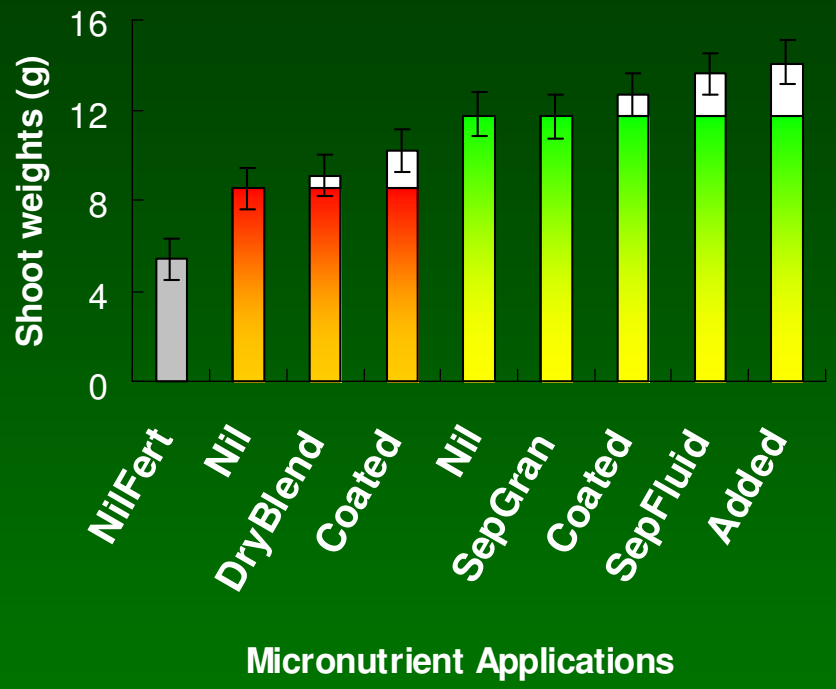
John Blue® Squeeze pump @ 170 L/ha

Yitpi Wheat @ 60 kg/ha

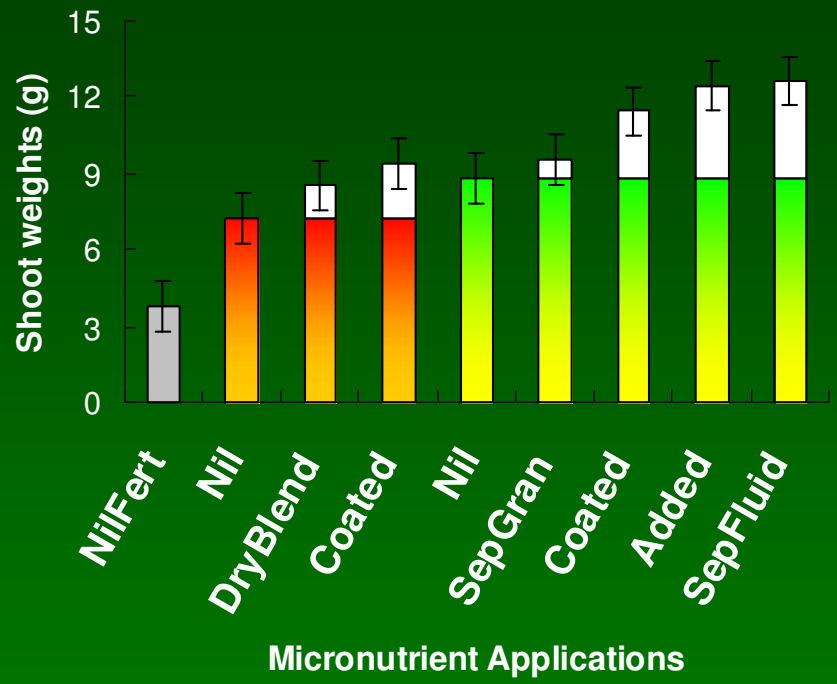
Sowing dates 21/06 & 24/06

FERTILISER	MICRONUTRIENT APPLICATION	PRODUCT
Granular	Nil	DAP
Granular	Dry Blend	DAP with Zn Mn Granules
Granular	Coated	19:13 Zn 1.2 Mn 3.3
Suspension	Nil	DAP into suspension
Suspension	Sep Granular	DAP into suspension with Zn Mn granules applied separately
Suspension	Sep Fluid	DAP into suspension with Zn Mn clear fluid applied separately
Suspension	Added	DAP with Zn Mn granules into suspension
Suspension	Coated	19: Zn 1.2 Mn 3.3 (coated granular product) into suspension
Nil fertiliser		

CUNGENA 2005



PORT KENNY 2005



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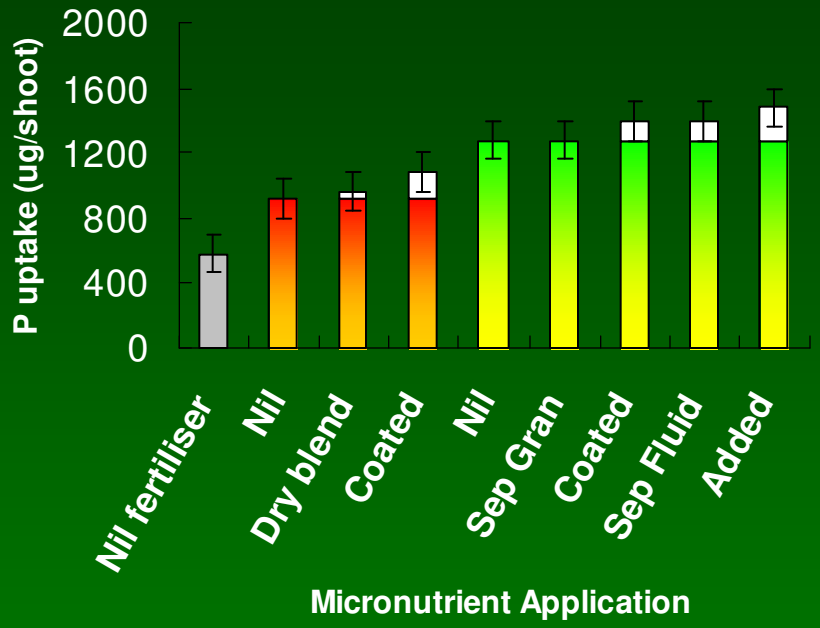
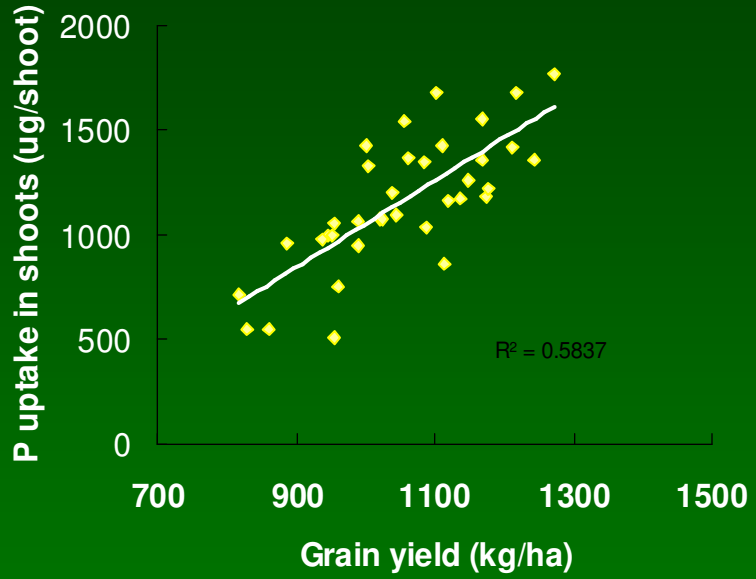
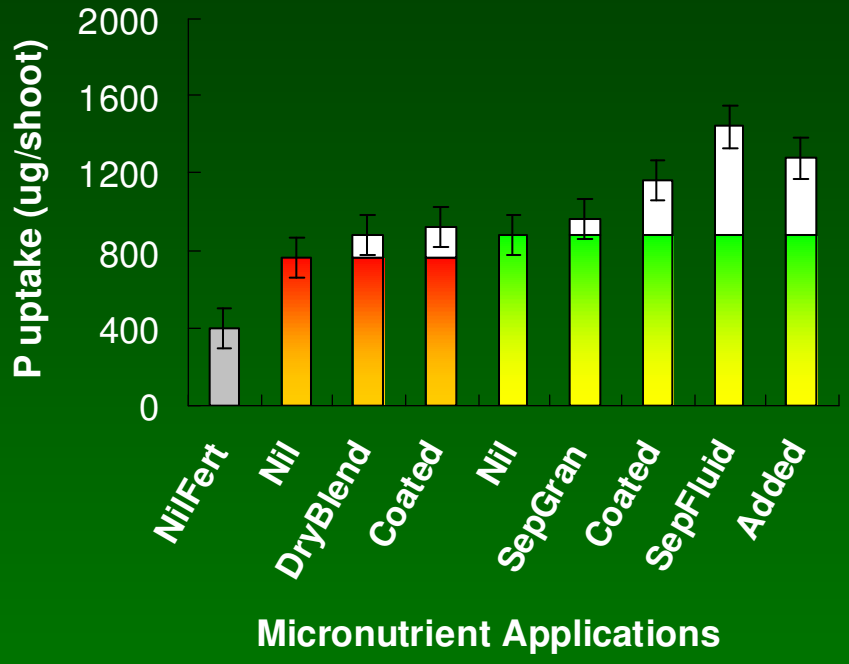
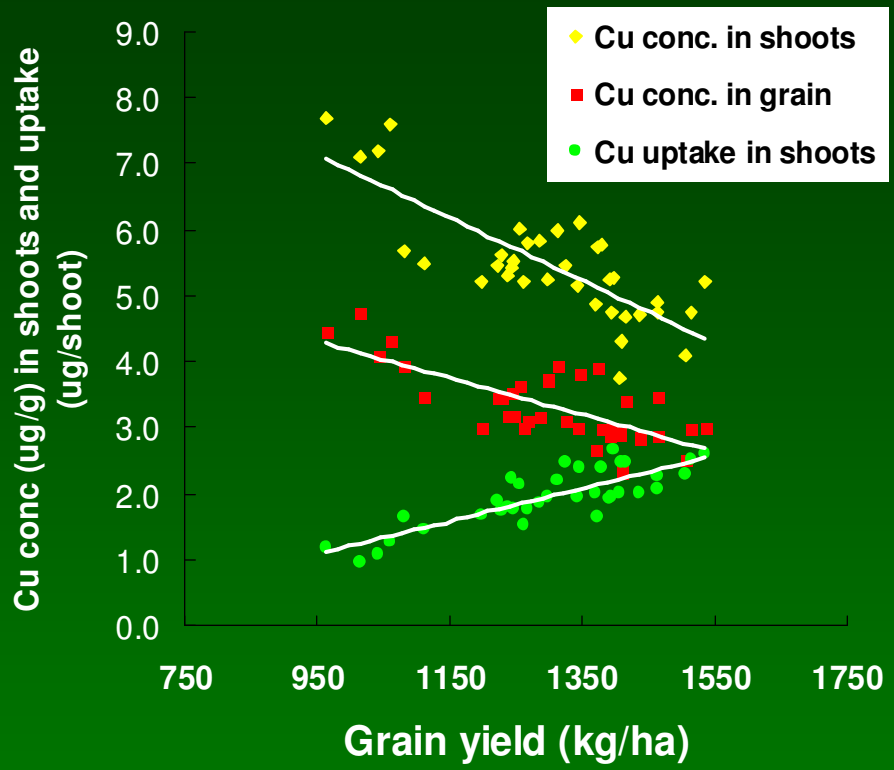


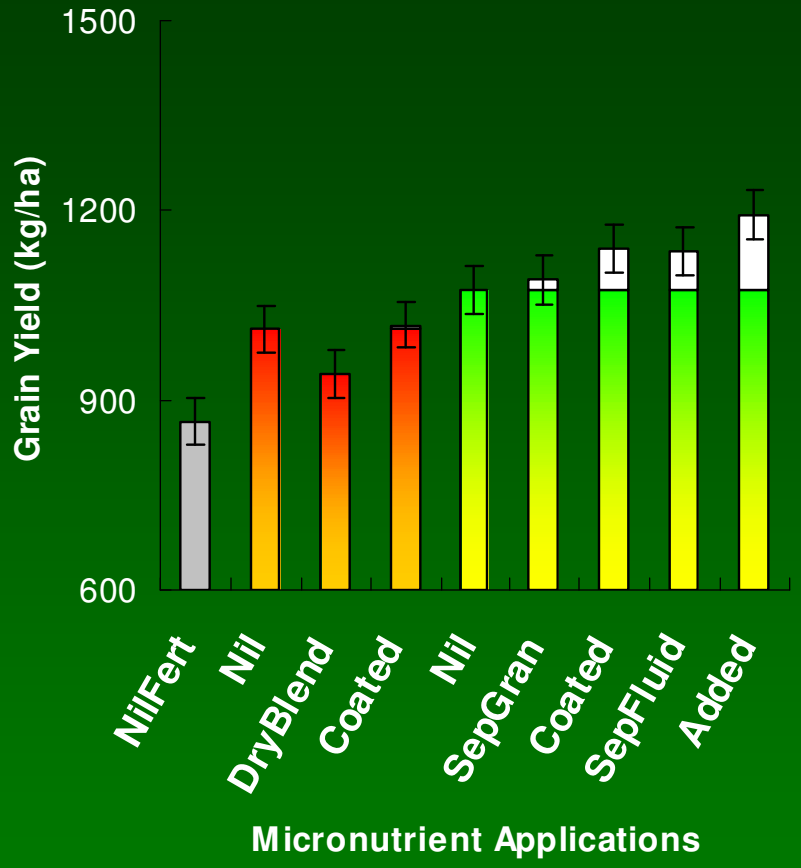


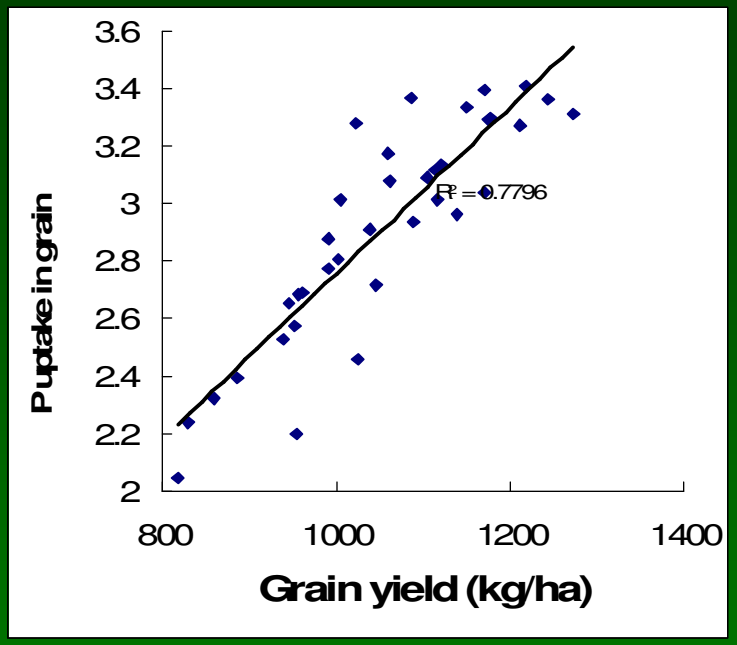
PORT KENNY 2005





CUNGENA 2005





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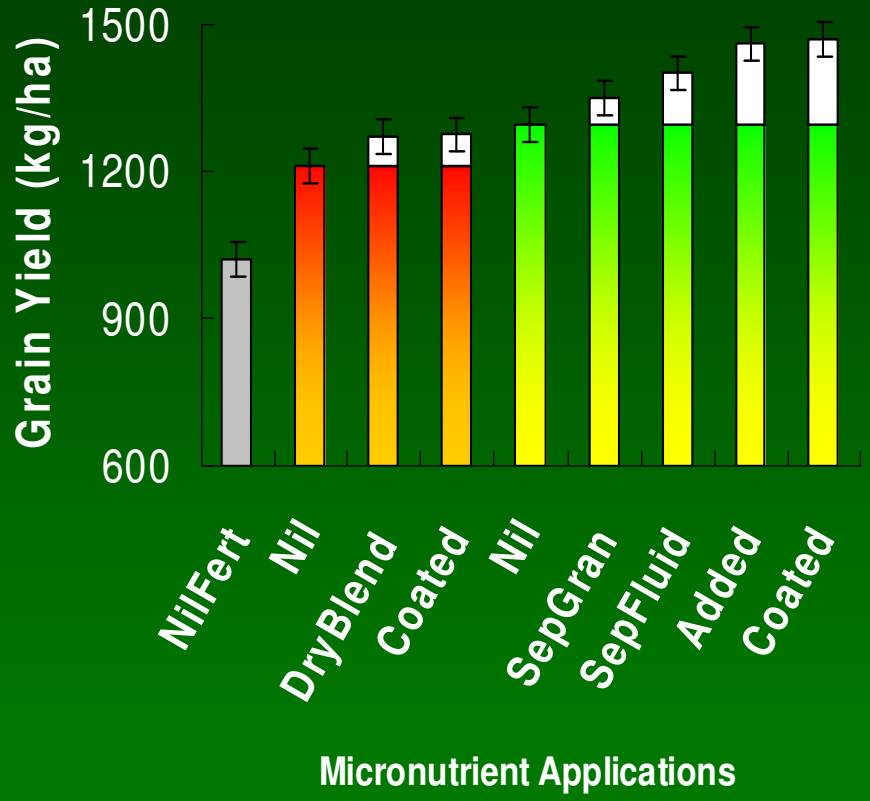

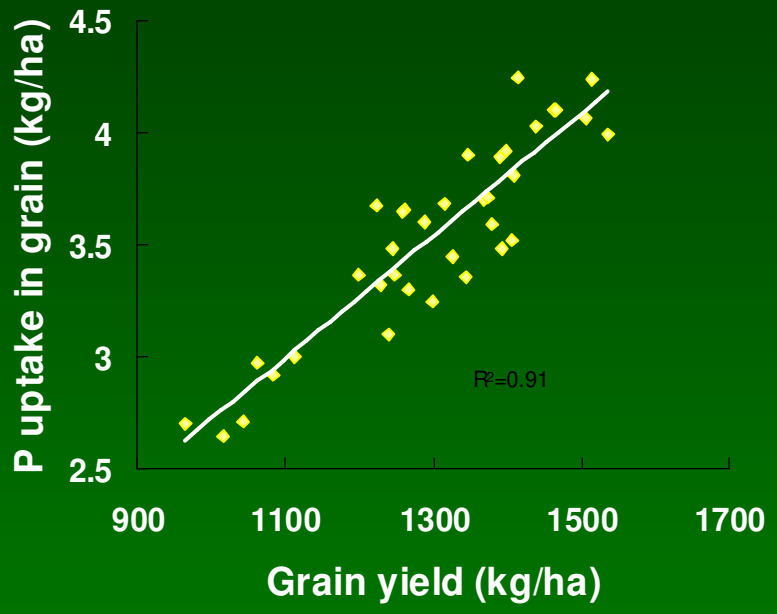

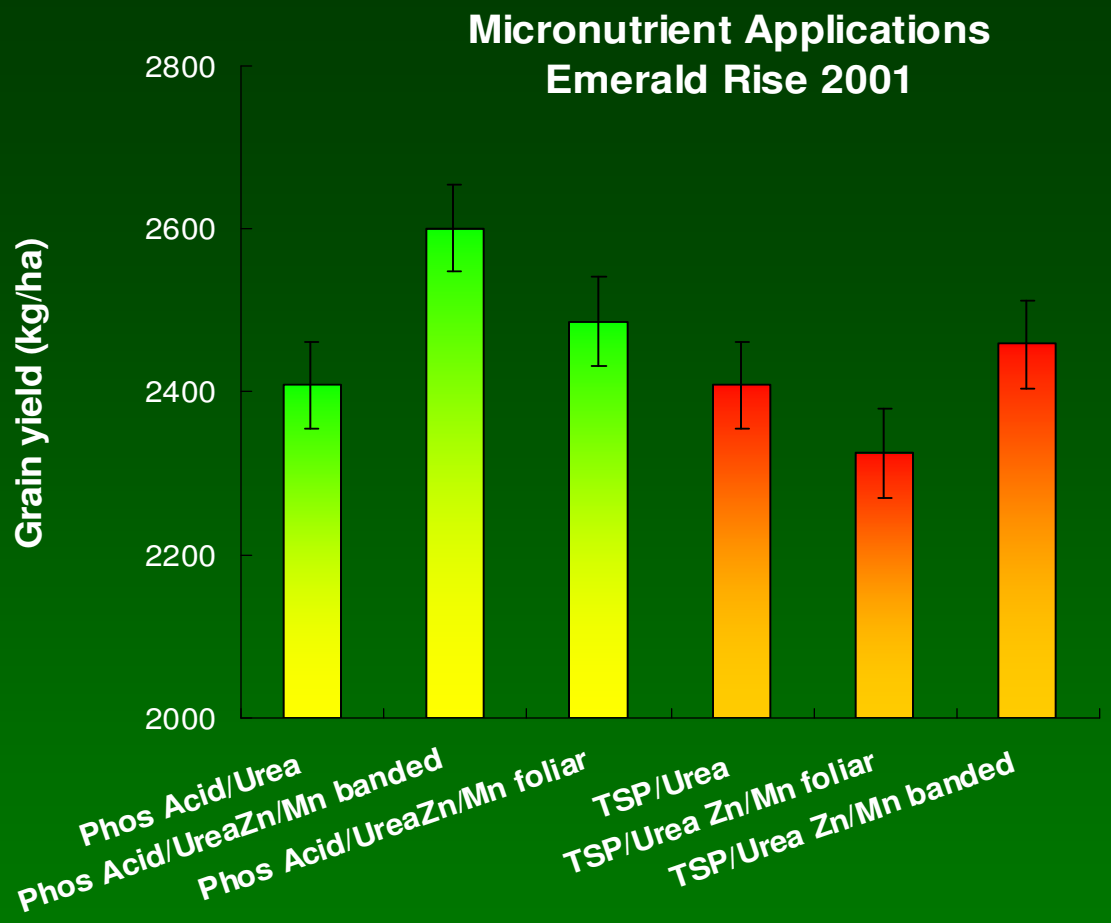
Micronutrient Applications
Emerald Rise 2001
Grain yield (kg/ha)
2800
2600
2400
2200
2000
Phos Acid/Urea
Phos Acid/UreaZn/Mn banded
Phos Acid/UreaZn/Mn foliar
TSP/Urea
TSP/Urea Zn/Mn foliar
TSP/Urea Zn/Mn banded

SUMMARY

- Fluids have some unique features for crop production
- Fluids are particularly adapted for specific placement—starters
- Fluids provide flexibility in placement and methods of application
- Uniform distribution of micronutrients in fluids can be a significant advantage