Ron Satterfield

Fairbury Micronutrients

Micronutrients

- What form makes sense or cents?
- Oxides
- Sulfates
- Citrates
- EDTA

Common Micronutrients

- Zinc
- Manganese
- Copper
- Iron
- Magnesium
- Boron

Oxides, Sulfates, and Chelates

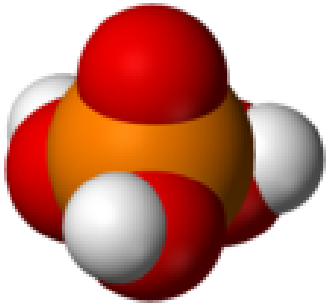
- Zinc Oxide, Zn Sulfate, Zinc Citrate, and Zinc EDTA
- Manganese Dioxide, Manganese Sulfate, and Manganese EDTA
- Copper Sulfate, Copper Citrate, and Copper EDTA
- Ferrous Sulfate, and Iron EDTA
- Manganese EDTA
- Boric Acid

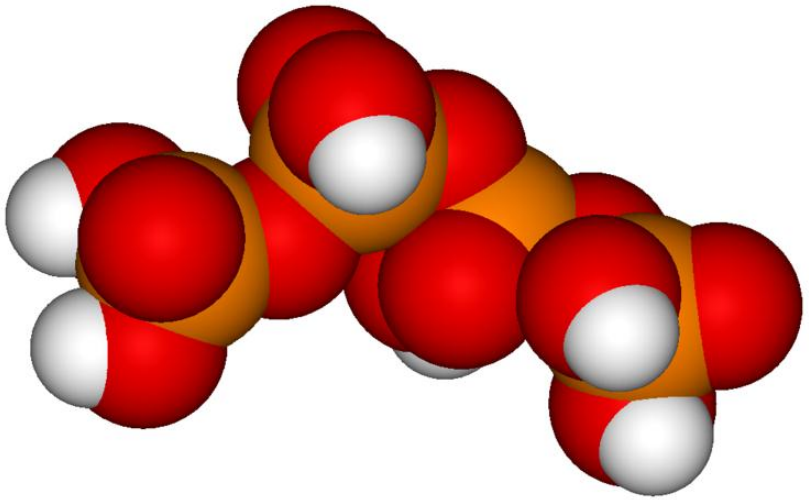
Protecting Zinc from Phosphate Costs Money!

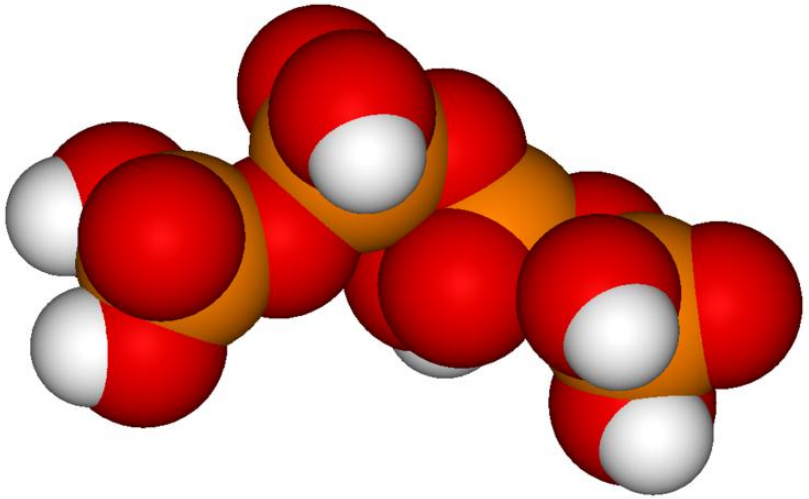
20%	10%	10%	9%
Ammoniated Zinc	Citric Complex Zinc	Citric/EDTA Complex Zinc	Pure EDTA Zinc

30% ORTHO

70% POLY







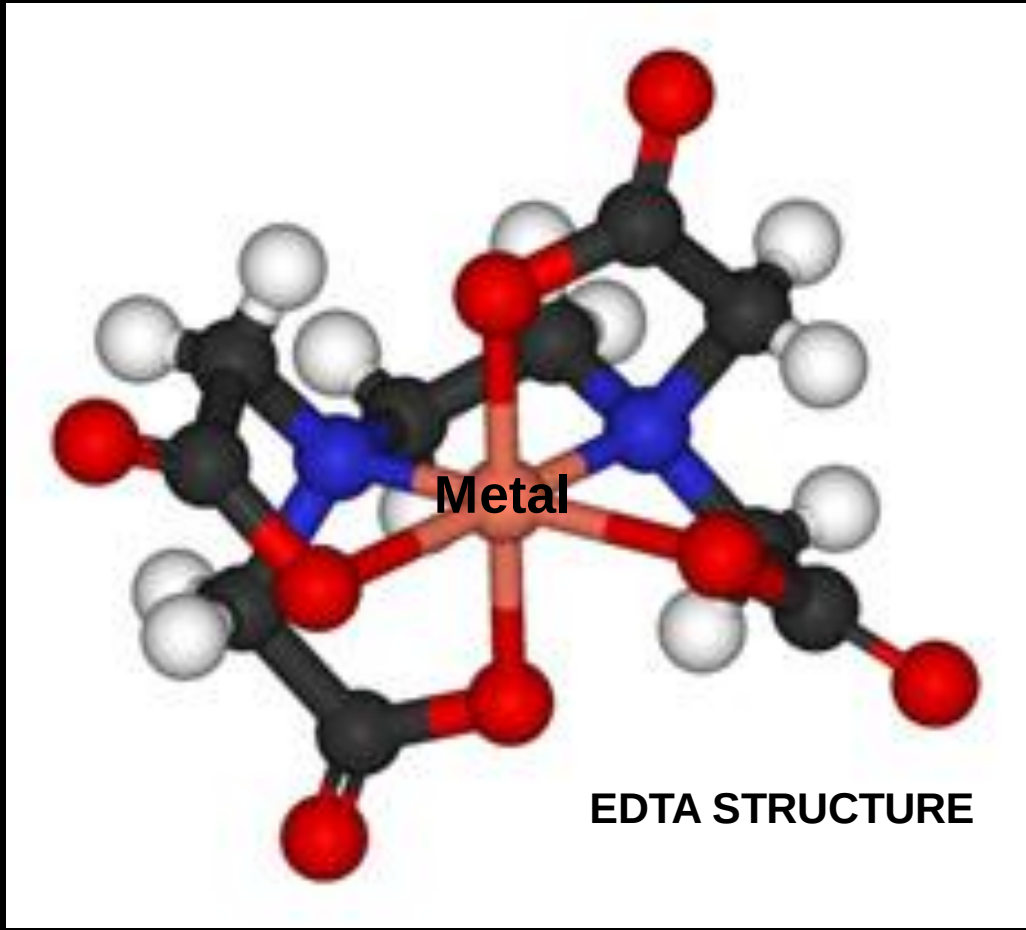
JAR TEST

There Is A Good Reason For This….

EDTA

Ethylenediaminetetraacetic Acid

(HO2CCH2)2NCH2CH2N(CH2CO2H)2



Protecting Zinc from Phosphate Costs Money!

20%	10%	10%	9%
Ammoniated Zinc	Citric Complex Zinc	Citric/EDTA Complex Zinc	Pure EDTA Zinc

THE FACTS ABOUT ZINC IN LIQUID STARTER FERTILIZER

ZINC IN STARTERS

RULE # 1 - **PHOSPHATE**  **ZINC**

PHOSPHATE + ZINC = "ZINC PHOSCRETE"

Most Starter Fertilizers Are High In Phosphate And The Zinc Must Be Protected From It

RiseR **Application**

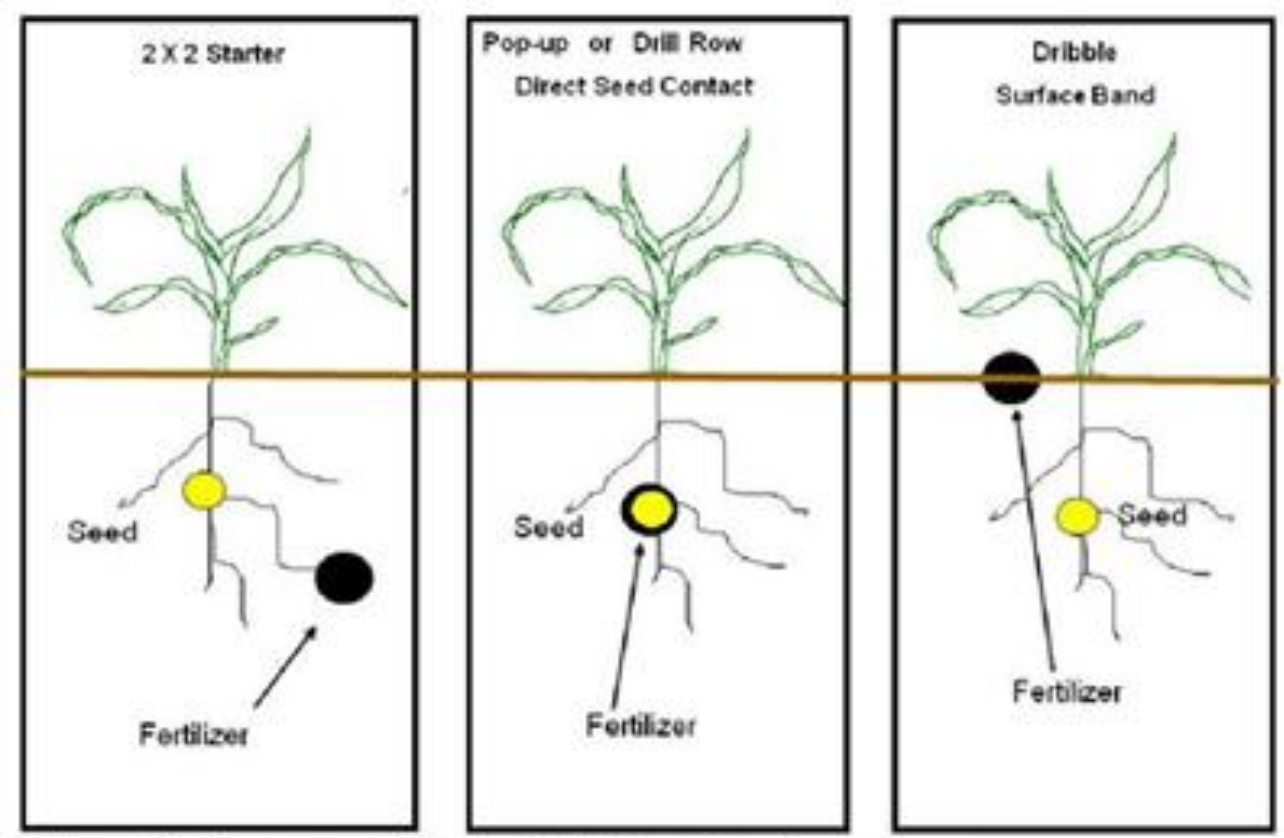


Figure 1. Common Starter Fertilizer Configurations.

ZINC Deficiency

- Activates Enzymes
- Needed for normal cell growth and development
- Taken up by root interception
- Somewhat mobile in plants

COMPATABILITY / STABILITY TABLE

	$	$$	$$$	$$$$
	20% Ammoniated	**10%** Citric Complex	**10%** Citric/EDTA Complex	**9%** Pure EDTA
Analysis	16-0-0-20Zn	8-0-0-10Zn	9-0-0-10Zn-4S	6-0-0-9Zn
Lbs/Gallon	11.1 ppg	9.6 ppg	11 ppg	10.9 ppg
Lbs of Elemental Zinc per Gallon	2.22 ppg	.96 ppg	1.1 ppg	1 ppg
Salt Out/Freeze	-40 F	+20 F	-40 F	+20 F
Complexing/ Chelating Agent	Ammonia	Citric Acid	Citric Acid/EDTA	Pure EDTA
Zinc Source	Zinc Chloride	Zinc Chloride	Zinc Sulfate	Pure Zinc Oxide
Mixes with 10-34-0	YES Major Agitation	YES Minimal Agitation	YES Splash Mix	YES Splash Mix
Mixes with Orthophosphate	NO	NO	NO	YES
Foliar Application	NO	NO	YES	YES
Irrigation/Fertigation	NO	NO	YES	YES

ZINC SOURCES

*Choose a Zinc Source Based On:

1. Type Of Starter Fertilizer

- RiseR with Micros!
- 10-34-0 Based?
- ORTHO (NACHURS,W.E.)?

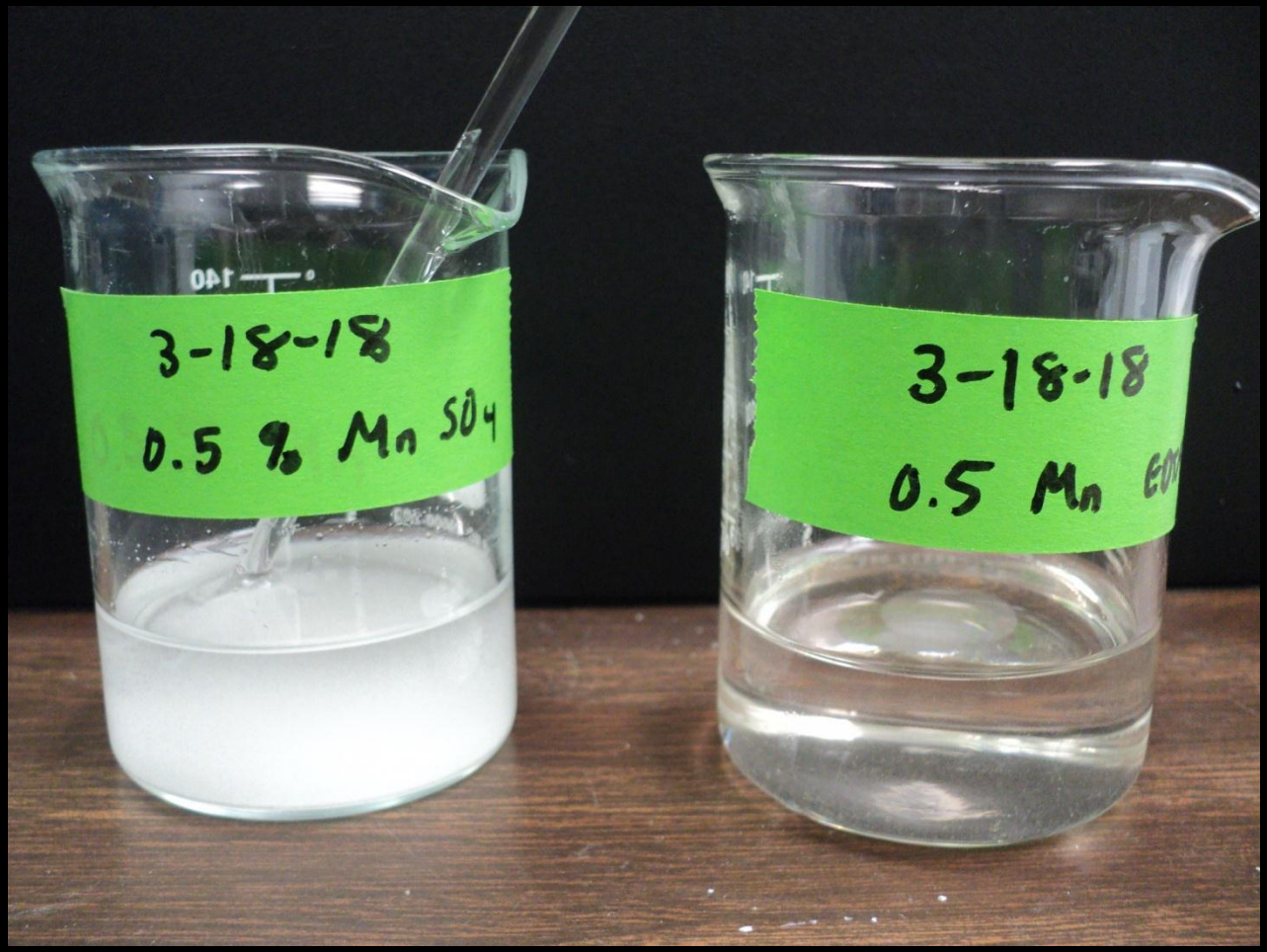
2. Temperature/Storage

3. Price/Cost Should Equal Performance

EDTA OVERKILL

9% EDTA Zinc is only necessary to mix with ortho phosphates, like. 3-18-18 or 9-18-9 etc.

Manganese

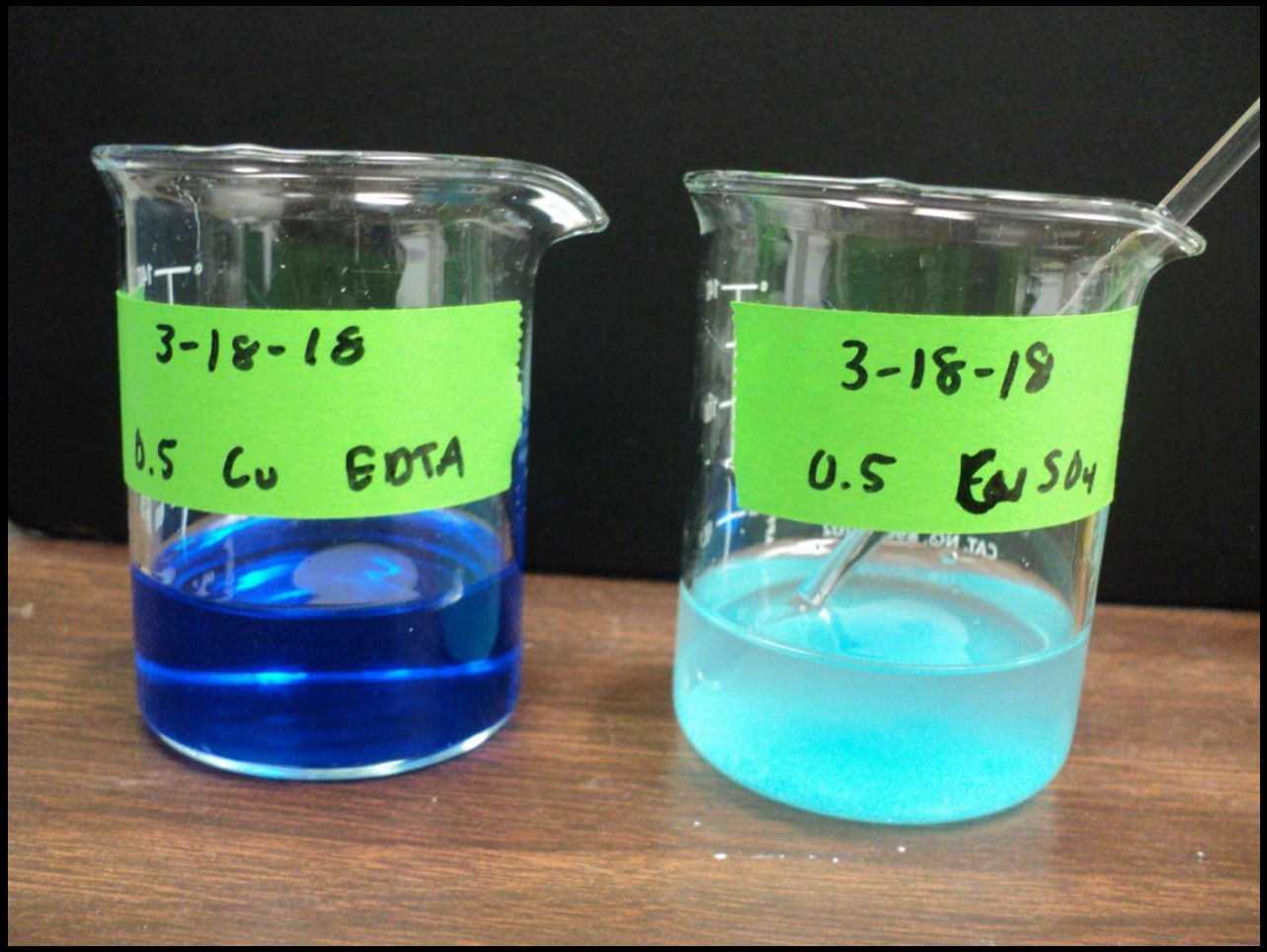


MANGANESE Deficiency

- Important for energy transfer, photosynthesis reactions

- Deficiency symptoms: greenish-grey spots or flecks on lower leaves; chlorosis

Copper

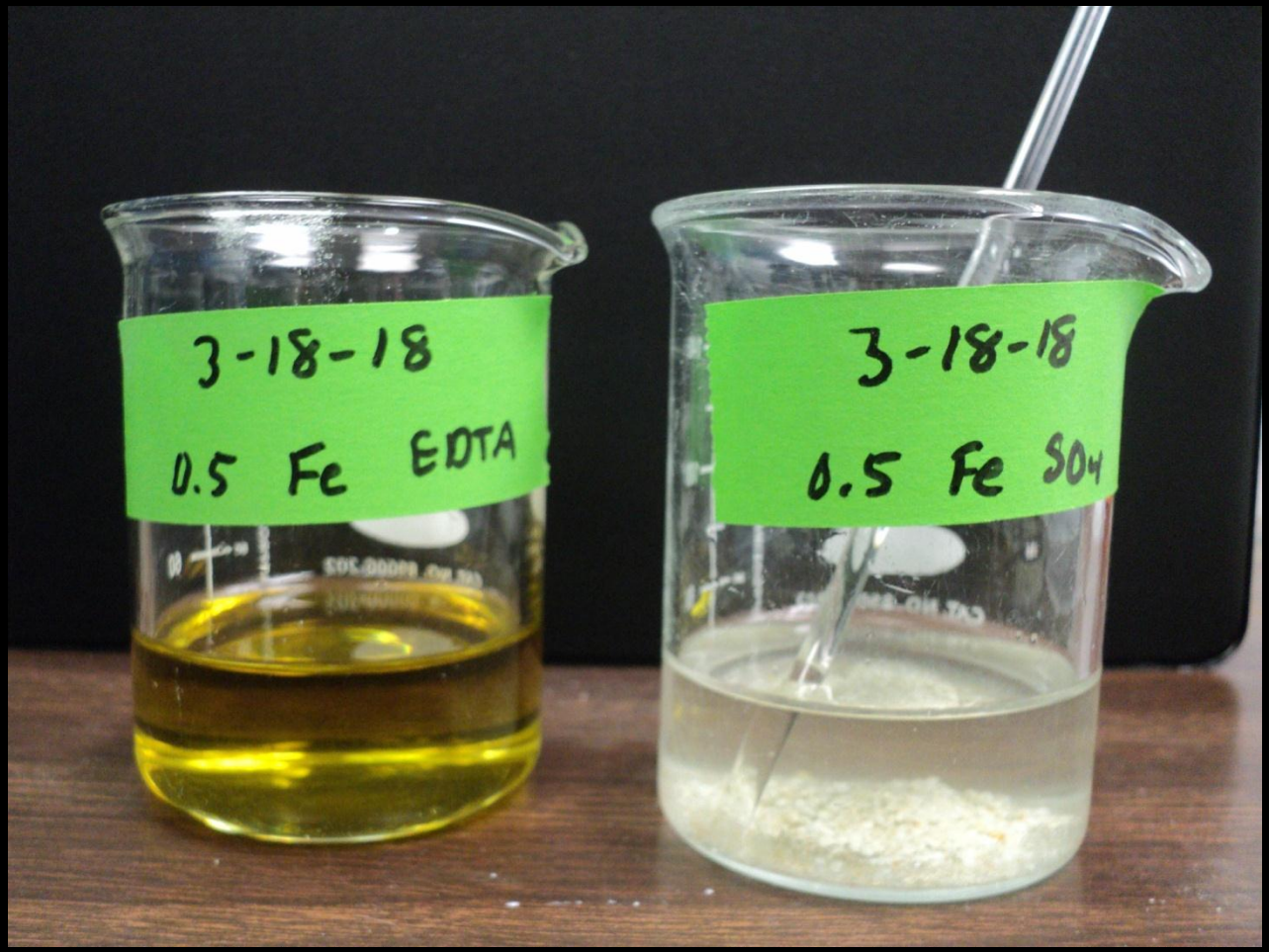


COPPER Deficiency

- Important for energy transfer, photosynthesis, and resistance to certain diseases.

- Deficiency symptoms: “White Tip” is a common disorder in cereal grains.

Iron



IRON Chlorosis

- Central role in chlorophyll production, photosynthesis, energy transfer within plant

- Deficiency symptoms: general yellowing or interveinal chlorosis (green veins, yellow between veins) on younger leaves

Thank You

- Comments?
- Question I might have a chance of answering?

Agrium
Advanced
Technologies

Smarter Ways To Grow™

Contact Information

- Ron Satterfield
- Senior Operations Manager
- Agrium Advanced Technologies

- 56906 Highway 8
- Fairbury, NE 68352
- 402-729-6191 office 402-587-2570 cell